Arizona Medicine

JOURNAL OF ARIZONA MEDICAL ASSOCIATION

MEDICAL SOCIETY OF THE UNITED STATES AND MEXICO

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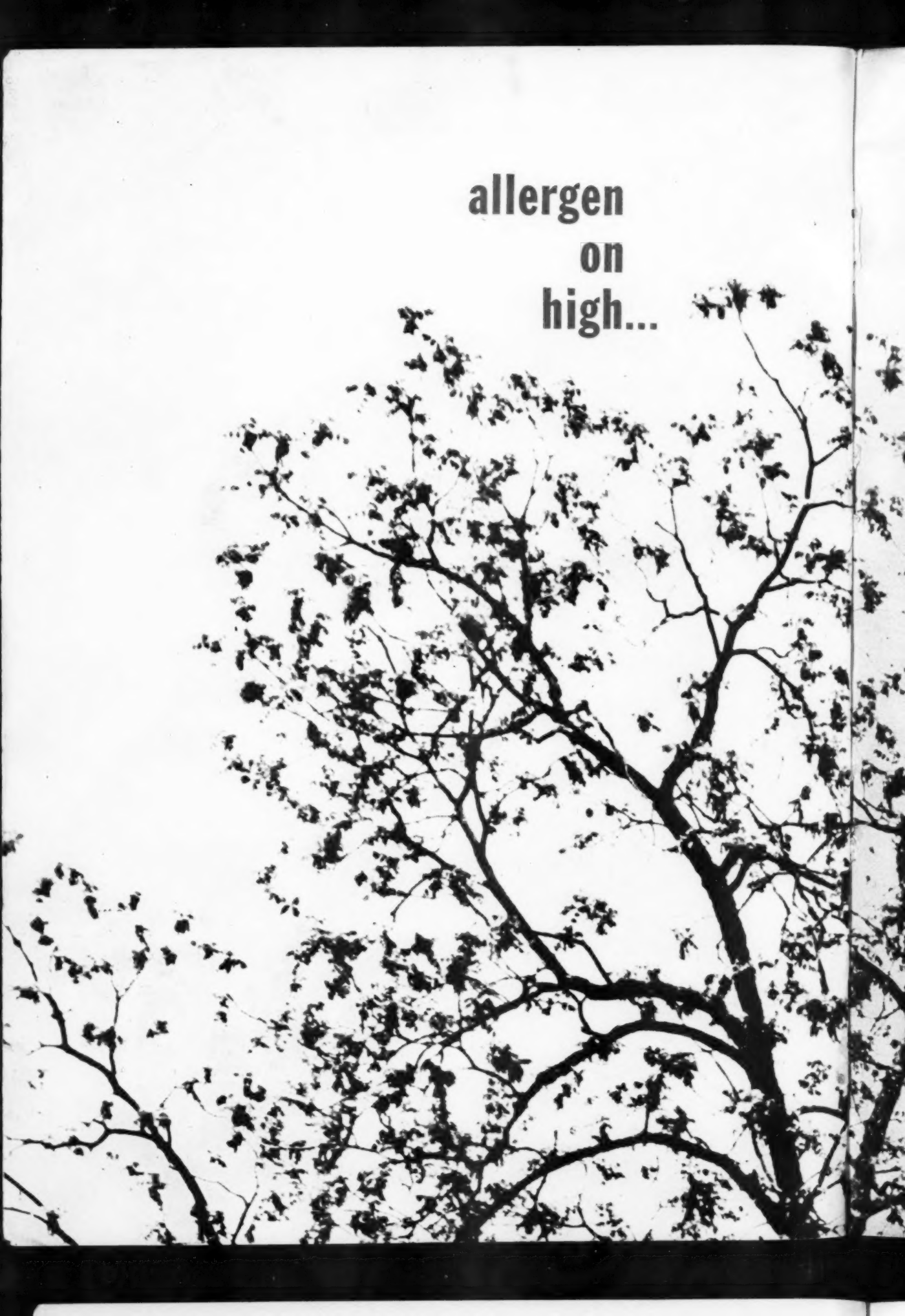
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June, 1960 Vol. 17, No. 6

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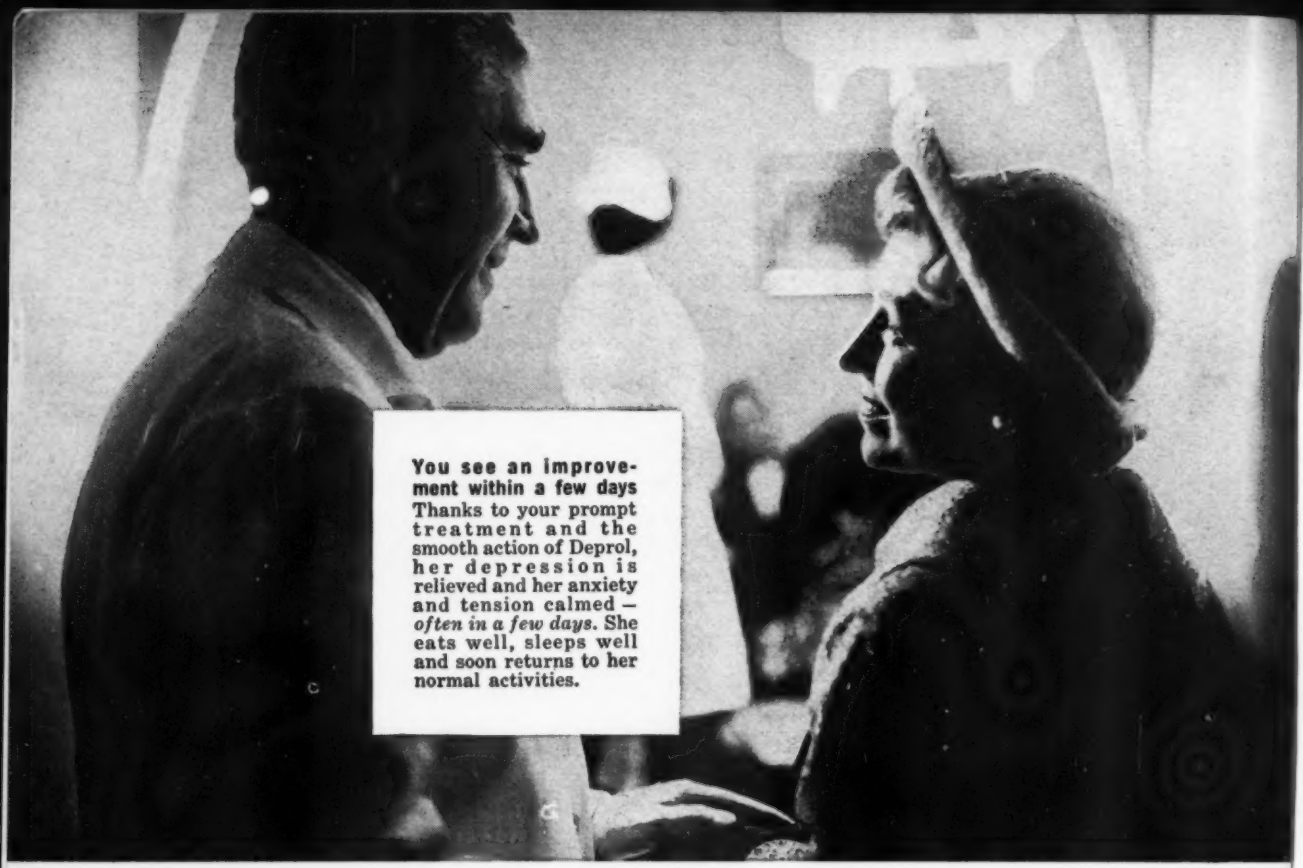

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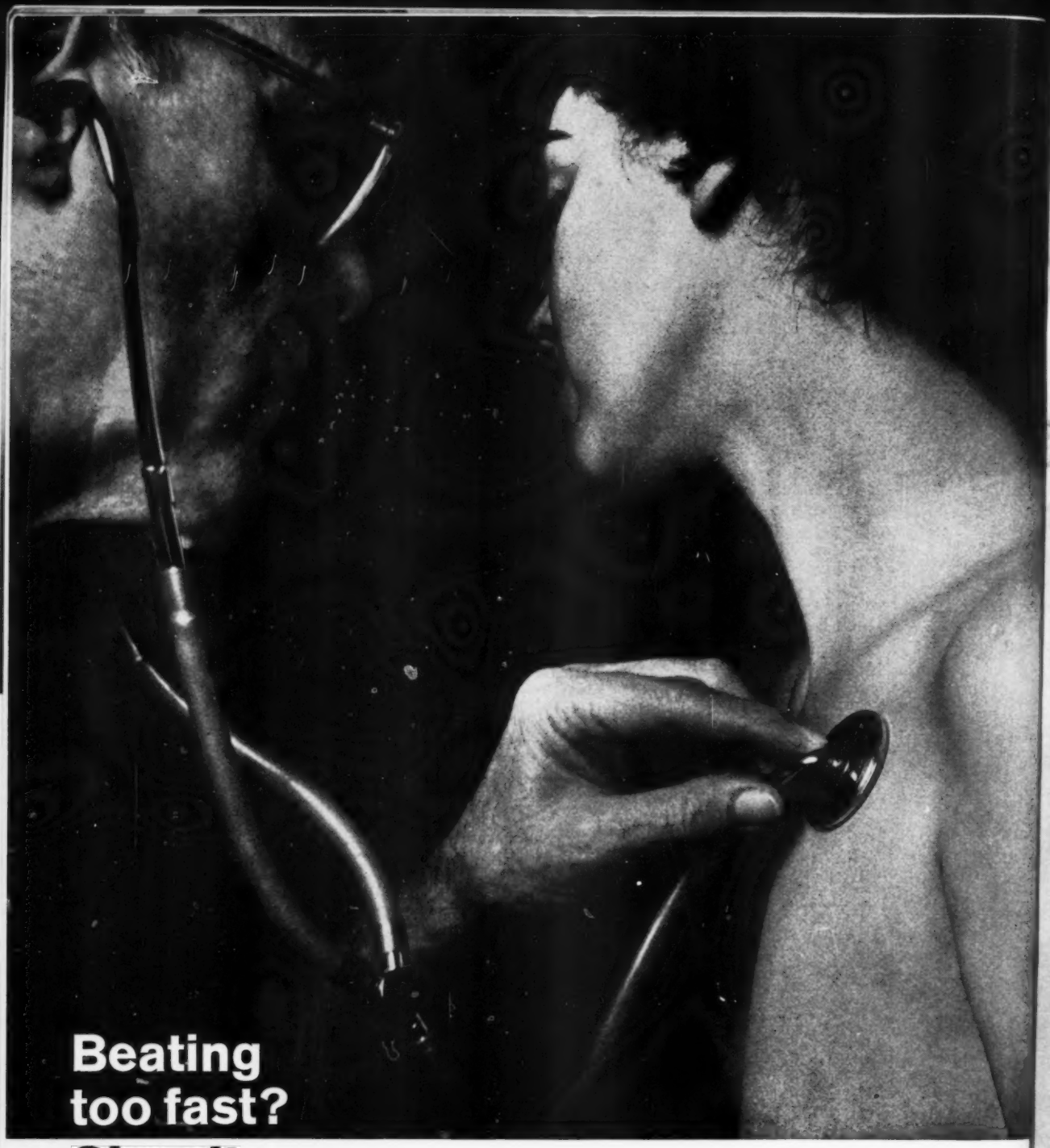

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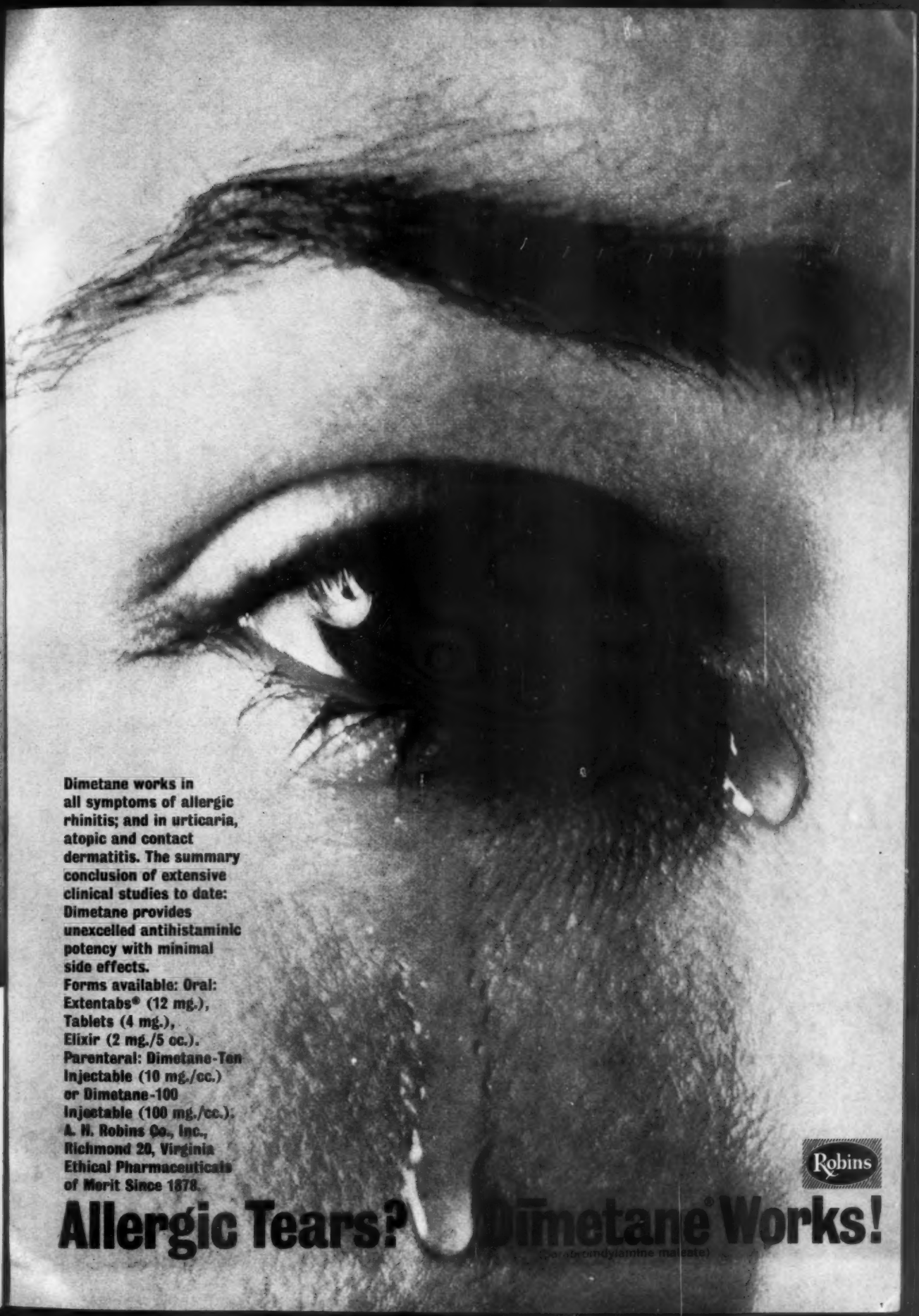
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Maximal Flexibility

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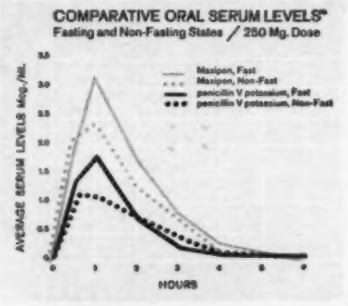

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ALPEN gives much higher antibiotic levels within the first hour of ingestion by the well-tolerated oral route.

WHEN TO USE ALPEN Recommended in the treatment of infections caused by pneumococci, streptococci, gonococci, corynebacteria, and penicillin-sensitive staphylococci.

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this is the tablet that gives higher peak antibiotic blood levels

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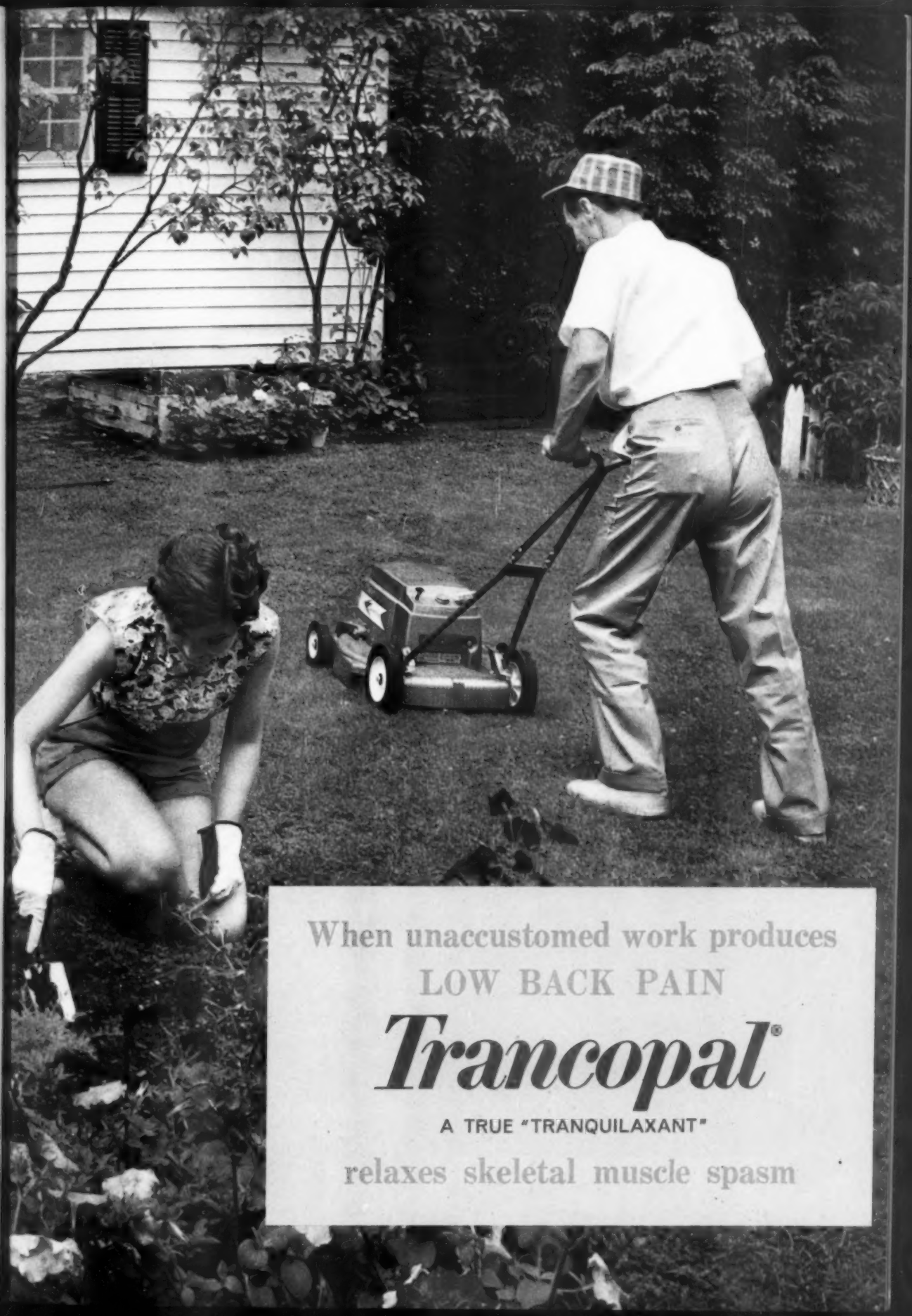

When unaccustomed work produces

LOW BACK PAIN

Trancopal®

A TRUE "TRANQUILAXANT"

relaxes skeletal muscle spasm

Trancopal®

BRAND OF CHLORMEZANONE

relieves
the pain
and disability
of
musculoskeletal
disorders

When enthusiastic gardening – or any of a host of other pleasant summer activities – brings on low back pain associated with skeletal muscle spasm, your patient need not be disabled or even uncomfortable for any length of time. The spasm can be relaxed with Trancopal, and relief of pain and disability follows promptly. The patient can usually continue his normal activities while taking Trancopal.

Lichtman[1,2] used Trancopal to treat patients with low back pain, stiff neck, bursitis, rheumatoid arthritis, osteoarthritis, trauma and postoperative muscle spasm. He noted that Trancopal brought satisfactory relief to 817 of 879 patients (excellent in 268, good in 448, fair in 101). "Chlormethazanone [Trancopal] not only relieved painful muscle spasm, but allowed the patients to resume their normal activities with no interference in performance of either manual or intellectual tasks."[1]

Gruenberg[3] also prescribed Trancopal for 70 patients with low back pain and observed that it brought marked improvement to all of them. "In addition to relieving spasm and pain, with subsequent improvement in movement and function, Trancopal reduced restlessness and irritability in a number of patients."[3] In another series of 193 patients Kearney[4] obtained relief with Trancopal in 181 patients suffering from low back pain and other forms of musculoskeletal spasm.

Trancopal enables the anxious patient to work or play. According to Gruenberg, "In addition to relieving muscle spasm in a variety of musculoskeletal and neurologic conditions, Trancopal also exerts a marked tranquilizing action in anxiety and tension states."[3] Lichtman[1] found that his patients in anxiety and tension states ". . . were in many instances able to continue their normal activities where previously they had been considerably restricted in their activities."[1] ". . . Trancopal is the most effective oral skeletal muscle relaxant and mild tranquilizer currently available." (Kearney)[4]

Side effects are rare and mild. "Trancopal is exceptionally safe for clinical use."[3] In the 70 patients with low back pain treated by Gruenberg,[3] the only side effect noted was a mild nausea which occurred in 2 patients. In Lichtman's group, "No patient discontinued chlormethazanone [Trancopal] because of intolerance."[1]

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Trancopal

potent muscle relaxant

effective tranquilizer

- In musculoskeletal disorders, effective in 91 per cent of patients.[5]
- In anxiety and tension states, effective in 89 per cent of patients.[5]
- Low incidence of side effects (2.3 per cent of patients).
  Blood pressure, pulse rate, respiration and digestive processes are unaffected by therapeutic dosage. It does not affect the hematopoietic system or liver and kidney function.
- No gastric irritation. Can be taken before meals.
- No clouding of consciousness, no euphoria or depression.

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Fibrositis
Myositis
Ankle sprain, tennis elbow
Osteoarthritis
Rheumatoid arthritis
Disc syndrome
Postoperative muscle spasm

Psychogenic disorders
Dysmenorrhea
Premenstrual tension
Anxiety and tension states
Asthma
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Alcoholism

How Supplied: Trancopal Caplets®

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Dosage: Adults, 200 or 100 mg. orally three or four times daily. Relief of symptoms occurs in from fifteen to thirty minutes and lasts from four to six hours.

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INDICATIONS

HEAD: temporomandibular muscle spasm • NECK: acute torticollis, osteoarthritis of cervical spine with spasm of cervical muscles, whiplash injury • TRUNK AND CHEST: costochondritis, intercostal myositis, xiphodynia • BACK: acute and chronic lumbar strains and sprains, acute low back pain (unspecified), acute lumbar arthritis and traumatic injury, compression fracture, herniated intervertebral disc, post-disc syndrome, strained muscle(s) • EXTREMITIES: acute hip injury with muscle spasm, ankle sprain, arthritis (as of foot or knee), blow to shin followed by muscle spasm, bursitis, spasm or strain of muscle or muscle group, old fracture with recurrent spasm, Pellegrini-Stieda disease, tenosynovitis with associated pain and spasm.

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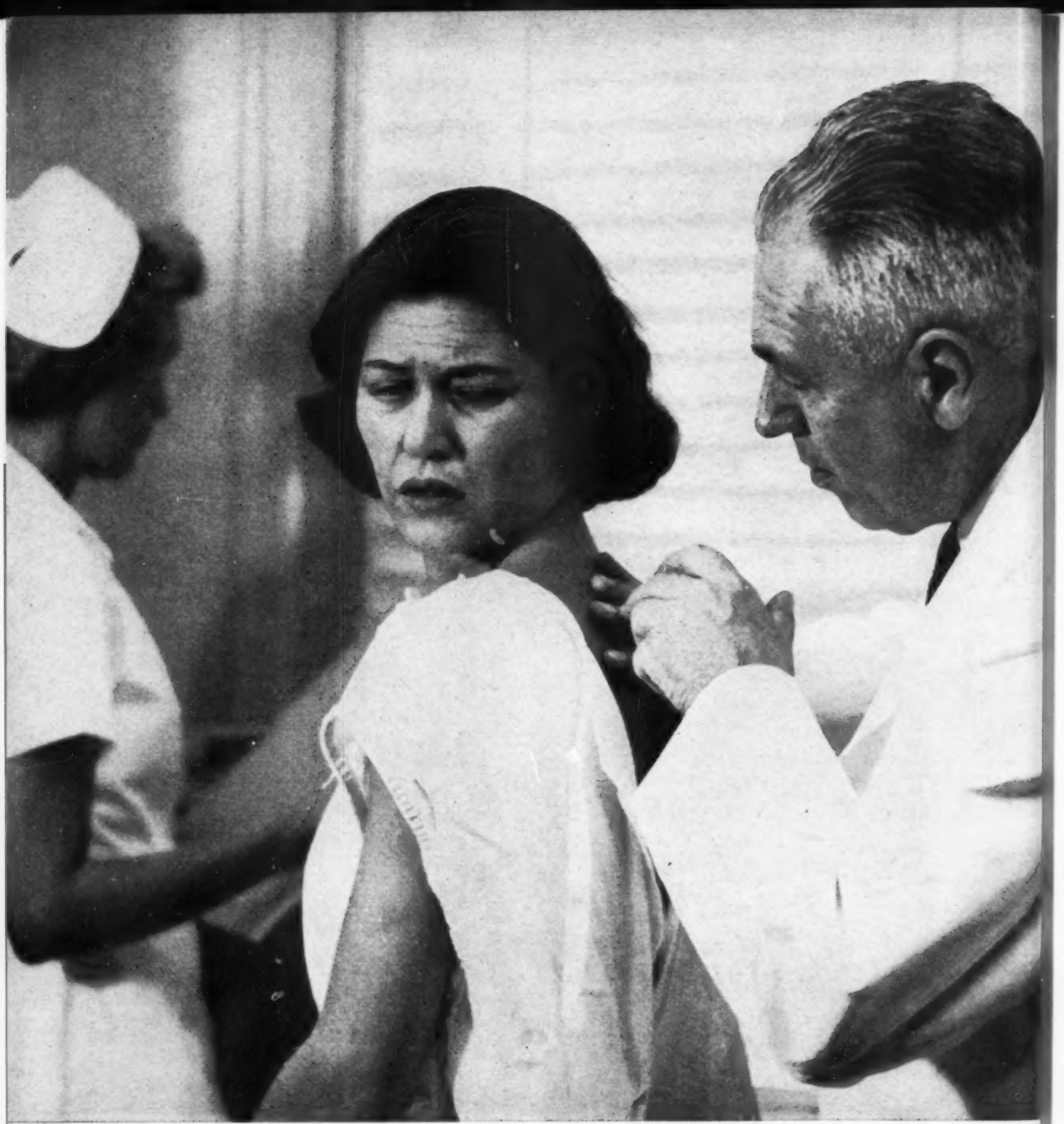

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OVARIAN TUMORS

PRACTICAL CONSIDERATIONS*

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FOR AN organ that normally contains only a few embryologically misplaced glandular structures in its hilar region, the ovary displays a confusingly complex spectrum of epithelial and connective-tissue neoplasms. Ovarian follicles and corpora lutea, which are normally small cystic structures found routinely at operation, may enlarge at times and give rise to symptoms and signs that require operative intervention. In this respect, they may mimic the more dangerous cystic and solid neoplasms. The ovaries provide extremely fertile soil for the settling out from lymphatic and blood vessels, as well as directly from the overlying peritoneum, of tumor cells originating in extraovarian locations. Metastatic ovarian tumors thus formed may mimic primary ovarian lesions. For the surgeon who has at hand facilities for histopathologic diagnosis by means of fresh frozen sections, the question of what treatment to employ for these various conditions is somewhat simplified. Without such facilities, thorough knowledge of gross characteristics is necessary on the part of the surgeon, who always should perform a careful examination of the lesion or lesions that he has removed before he closes the abdomen. The following observations may be useful to him.

Eighty per cent of ovarian tumors are cystic, and the majority of these are benign; 20 per cent of ovarian tumors are solid, and two-thirds of these are malignant. Of ovarian tumors occurring in women less than 30 years of age, 95 per cent are benign, and they are non-neoplastic in many instances. By contrast, any ovarian enlargement in a woman who has passed the menopause is likely to be of a serious nature. Table 1 lists the predominantly cystic ovarian lesions. A few remarks concerning the individual types may be helpful.

PHYSIOLOGIC CYSTIC OVARIAN LESIONS

The simple cysts, which are surgical problems only when they are large, are usually unilateral, unilocular, thin-walled and translucent. They never exhibit papillary excrescences. The luteal variety may reveal a yellowish lining. They may be treated by means of simple excision unless they are twisted and infarcted, in which event sacrifice of the involved ovary will be necessary.

*Read at the meeting of the Arizona Division of the American Cancer Society, Phoenix, Arizona, January 14 to 16, 1960.
†The Mayo Foundation Rochester, Minnesota, is a part of the Graduate School of the University of Minnesota.

The type associated with hirsutism, infertility, hypertension and other features of the Stein-Leventhal syndrome is an exception; in such cases, both ovaries are symmetrically enlarged and have thick white fibrous capsules, underneath which lie clusters of small cortical cysts. Corpora lutea are not evident. Bilateral surgical resection of wedges from the ovary is reputed to cure this condition by interrupting the continuity of the fibrous cortical rind, which is a barrier to ovulation. Among older women with the Stein-Leventhal syndrome, dilation and curettage is especially indicated, since there is a high incidence of associated endometrial carcinoma.

NEOPLASTIC OVARIAN CYSTS

Cystadenomas are neoplastic cysts lined by columnar epithelium. They include serous and mucinous subtypes. Both types are larger than simple cysts, and the mucinous variety of lesions have a pronounced tendency to be multilocular. Cystadenomas should be removed intact, because the mucoid contents of the latter type are irritating to the peritoneum and because both types may harbor foci of early papillary carcinoma in their interiors. Serous cystadenoma may be associated with white fibrous warty excrescences that lead to confusion with papillary carcinoma unless the existence of the papillary subtype is recognized. Papillary features in a mucinous tumor always indicate malignant transformation.

Endometriomas are perforating tarry cysts that are bilateral in 80 per cent of cases and are often adherent to surrounding structures. Punctate, bluish-black nodules nearly always occur on the adjacent peritoneum, especially in the region of the cul-de-sac. Destruction of the ovary by the endometriotic process may be much more extensive than casual inspection of the involved ovaries would indicate, and the success of "conservative" ovarian resection in the surgical treatment sometimes depends on knowledge of this fact. Carcinomatous change in this heterotopic endometrial tissue is a serious late complication that has been recognized only recently.

The presence of bones and teeth in addition to a surprising degree of radiolucency may lead to the preoperative roentgenologic diagnosis of an ovarian dermoid. At laparotomy, the yellow color of the thick leathery capsule, combined with a doughy feeling, often indicates the correct diagnosis. The oily contents of dermoids are extremely irritating to the peritoneum; accordingly, every effort should be made to deliver such lesions from the abdomen in an unruptured state. Fortunately, it is usually easy to accomplish this, because dermoids seldom are extremely large and because they are lined by skin that is rich in fibrous and elastic tissue. Whereas the vast majority of testicular teratomas are malignant, almost 98 per cent of their ovarian counterparts belong in the benign, or "dermoid," category.

Overgrowth of any one of the numerous types of tissue in ovarian dermoids may give rise to such interesting entities as strumal tumors (with their 90 per cent incidence of associated ascites), carcinoid tumors, squamous cell carcinomas, gliomas and, more rarely, malignant melanomas.

Dermoids are bilateral in 10 per cent of cases, and the experience of "striking oil" through an aspirating needle introduced into a seemingly normal contralateral ovary can be a rewarding experience for the careful surgeon. Small or even medium-sized dermoids can be dissected free without interfering with the function of residual ovarian tissue.

Cystic ovarian carcinomas are, for the most part, malignant "opposite numbers" of serous and mucinous cystadenomas or, more rarely, of endometriomas and dermoids. Bilateral in about a third of cases, they are frequently papillary. Extensive mucous cystadenocarcinomas are prone to produce the condition known as "jelly belly," which frequently leads to death from intestinal obstruction. Unruptured cystadenocarcinomas are curable in perhaps 50 to 60 per cent of cases after radical pelvic surgical treatment. Serous cystadenocarcinoma, when well differentiated, displays intracystic and extracystic papillary excrescences that become implanted on the peritoneum and omentum in the form of delicate noninfiltrating frondlike projections. These low-grade neoplasms appear to be dependent on hormones, and extirpation of all ovarian tissue has an inhibitory effect on the implants. Some degree of radiosensitivity is likewise apparent, and postoperative roentgen therapy causes further regression of the secondary lesions and reduction in troublesome accumulations of ascitic fluid.

In the more undifferentiated examples of serous and mucinous cystadenocarcinomas, papillary excrescences are replaced by necrotic solid masses of tissue in the primary growth and solid

TABLE 1
CLASSIFICATION AND INCIDENCE OF CYSTIC OVARIAN TUMORS*

Lesions	*Incidence, per cent*	*Bilateral, per cent*
Physiologic Nonsurgical except when large		
Follicular cysts	10	Rare
Luteal cysts	5	Rare
Compound luteal cysts	Rare	50
Corpus albicans cysts	Rare	Rare
Neoplastic		
Serous cystadenomas		
Type "ordinaire"	10	25
Fibrous papillary type	2	25
Mucinous cystadenomas	8	20
Endometriomas	27	70
Cystic teratomas (dermoid, etc.)	8	10
Cystadenocarcinomas	30	50
Serous, mucinous, endometrial, others		

*Based on a series of 2500 ovarian tumors, 2000 of which were cystic (80 per cent).

"caking" of the omentum. Few indeed are the miracles that can be performed by radical removal of these lesions. In such cases, metastatic tumors in the fallopian tubes and endometrium often are present.

SOLID OVARIAN TUMORS

Table 2 lists some of the commoner solid tumors of the ovary. When observed at laparotomy, such lesions are usually malignant; if bilateral involvement is evident, a careful search

TABLE 2
CLASSIFICATION AND INCIDENCE OF SOLID OVARIAN TUMORS*

Lesions		*Incidence, per cent*
Functioning neoplasms		15
Granulosa cell tumors		10
Theca cell tumors	Feminizing	2
Sertoli cell tumors		Rare
Arrhenoblastomas		1
Adrenal-like carcinomas	Masculinizing	Rare
Leydig cell tumors		Rare
Dysgerminomas	"Neutralizing"	2
Nonfunctioning neoplasms		85
Fibromas		30
Brenner's tumors		3
Mesotheliomas		Rare
Adenofibromas		3
Adenocarcinomas		35
Serous, mucinous, endometrial, mesonephromatous, others		3
Teratomas		3
Sarcomas		1
Metastatic (Krukenberg type)		2
Metastatic (other types)		8

*Based on a series of 2500 ovarian tumors, 500 of which were solid (20 per cent.)

must be made to rule out the possibility that the neoplasms are metastatic.

Fibroma, one of the commoner benign solid tumors, may be distinguished grossly by its smooth capsule and its peculiar white color. Prone to twist on their pedicles, these tumors, when sizable, frequently are associated with ascites and sometimes with hydrothorax. Increasing awareness of Meigs' syndrome on the part of clinicians and surgeons has dispelled the older notion that ascites and hydrothorax in a woman with a pelvic tumor invariably indicated malignancy. Fibromas almost always remain benign, despite a worrisome degree of cellularity when they are examined microscopically.

The surgeon usually will make a diagnosis of fibroma on the first few examples of Brenner's tumor that he encounters. This mistake is not serious, because the Brenner tumor, like fibromas, is almost always benign. The pathologist may fall into the error of mistaking for metastatic carcinoma the benign nests of squamous-like cells that characterize this exotic lesion, but since a primary is never found, the patient should not experience any ill consequences, particularly if she is not made aware of the diagnostic problem.

Primary solid carcinomas of the ovary are often cystadenomas that, undergoing malignant change, have proliferated to the extent of obliterating their original cysts of origin. Others are active malignant endometriomas that sometimes display microscopic mixtures of squamous cells and adenomatous cells (adeno-acanthomas). Still others represent malignant forms, pure or mixed, of complex teratomas that are behaving like their testicular counterparts. From the realm of pathologic curiosities appear the hypernephroid carcinomas and the mesonephromas. A sizable residue of solid tumors defy classification because they are so anaplastic. As compared with cystic ovarian carcinomas, these solid growths generally are rapidly growing tumors associated with an extremely bad prognosis.

Functioning Solid Ovarian Tumors

No consideration of ovarian tumors would be complete without reference to a small group of neoplasms that induce physiologic alterations in their hosts. The term "functioning" has been applied to such lesions. Granulosa cell and theca cell tumors share a common origin from the cortical ovarian mesenchyme and sometimes are grouped together under the term "feminizing mesenchymoma." When, as happens occasionally, they affect children, such tumors induce precocious puberty, with menstrual-like bleeding. When they occur between puberty and the menopause, they give rise in most instances to amenorrhea. In older patients, semiperiodic vaginal bleeding of a menstrual-like character is observed. Uterine myohypertrophy, uterine fibroids and thick proliferative endometrium are taken as measures of estrogenic production by the tumors. Endometrial and mammary carcinomas develop in some of the older patients affected by these tumors. The ovarian tumors themselves are unilateral and solid. Theca cell neoplasms are characteristically yellow and have the fibrous consistency of fibromas; the granulosa cell tumors are brownish and of a consistency likened to that of liver sausage. Theca cell tumors are composed of spindle cells, whereas granulosa cell growths, as the name implies, feature small round cells, often disposed in rosettes (Call-Exner bodies). Occasionally, and especially in older patients, these tumors behave aggressively.

Arrhenoblastomas supposedly arise from male-directed elements (testicular tubules and Leydig's cells), which frequently occur in the hilar regions of otherwise normal ovaries. A teratomatous origin has been claimed by some investigators. Tumors of this type, which cause clinical masculinization, usually exhibit large numbers of Leydig's cells, with many of the Sertoli elements forming a primitive spindle cell matrix that in some areas is oriented about the lumina of tubules. With a preponderance of Sertoli's cells, tubules are numerous and well formed, and these tumors may be feminizing or the hormonal summation may be a "neutral" one. On rare occasions, the tumor may be composed entirely of Leydig's cells, and the patient may be thoroughly masculinized. The rate of recurrence among these tumors is discouragingly high.

The rare masculinovoblastoma is a neoplasm arising from heterotopic adrenal cortical tissue and producing a clinical picture like that of Cushing's syndrome. Grossly and microscopically, these tumors resemble their adrenal cortical counterparts; about 50 per cent of them prove fatal as a result of recurrence and metastasis.

The ovarian dysgerminoma may be classified as a neutralizing tumor. It is exactly similar to a testicular seminoma and is the commonest gonadal tumor affecting pseudohermaphrodites.

However, its removal does not alter the pre-existing sexual habitus of the patient, and it may occur during the distinctly "unneutral" state of pregnancy. Dysgerminoma is a primitive gonadocytoma.

The achievement of occasional successful cures by local removal of these highly anaplastic neoplasms unfortunately has dictated an unrealistic approach to their treatment. About one third of the dysgerminomas are bilateral, and the recurrence rate is extremely high in long-term, follow-up studies. Fortunately, dysgerminomas and their recurrent and metastatic nodal deposits are extremely radiosensitive, and near miracles may be achieved therapeutically in seemingly hopeless cases if this important fact is kept in mind. Dysgerminomas occasionally exhibit admixtures with complex teratomatous elements, and such a microscopic combination bodes ill for the patient.

Metastatic Ovarian Carcinomas

Finally, mention should be made of metastatic ovarian carcinomas, which comprise at least 10 per cent of any sizable surgical series of solid ovarian tumors. They are frequently mistaken for primary growths. In general, such tumors represent either retrograde metastatic deposits or localized evidence of a seeding process that eventuates in peritoneal carcinomatosis. Carcinoma, rather than sarcoma, is the underlying lesion in more than 90 per cent of the cases. An important surgical clue to the diagnosis lies in the finding of bilateral solid ovarian neoplasms, although a fairly large number of such lesions grossly appear to be unilateral. The uterus, breast, sigmoid, pancreas and stomach provide the bulk of the primary sites, but metastatic ileal carcinoids, lymphomas of the retroperitoneum, malignant melanomas and even fibrosarcomas have been encountered.

Because of the tendency of these solid tumors to twist on their pedicles and become infarcted or to produce large quantities of ascitic fluid, their removal is indicated even though the procedure is strictly palliative.

HEALTH INSURANCE BENEFITS DOUBLE IN FIVE YEARS

American families received about $3.1 billion in benefits under voluntary health insurance duirng a 12-month period in 1957-58, Health Information Foundation reported – more than double the amount for a similar period five years earlier.

The average insured family in 1957-58 had $80 in benefits from voluntary health plans. This is an increase of 78 per cent over the $45 reported in a comparable survey for 1952-53.

Insurance benefits now pay for 24 per cent of the average insured family's total bill for hospital, medical, dental, and other health services, the H.I.F. report said. Five years earlier the figure was only 19 per cent.

One of the most significant findings of the survey, commented George Bugbee, Foundation President, is that families with unusually heavy costs for health care have been helped the most by recent increases in insurance benefits.

For example, families with health costs of $1,000 and over averaged $572 in benefits for 1957-58 against only $362 in 1952-53. Families spending between $750 and $1,000 in 1957-58 received $257 in benefits, while comparable families in 1952-53 received only $204.

(H.I.F. REPORTS)

HEMOPHOBIA

by

Philip F. Swigart*

WIRE services of the Associated Press recently carried this item: "Cape Carnivera, Africa, November 17 — Jungle drums today beat out a tragic prelude to the arrival of civilization in this last of Africa's primitive tribal communities. It was a grim story of filicide, perpetrated by the parents of a 14-year-old boy-victim of hemophobia.

"Tribal medicine men, attending the boy in a local hospital, had prescribed whole blood (human) to be taken orally, which is the only known jungle remedy for this otherwise fatal malady. But the boy's parents refused to consent to the treatment, objecting that it would be a form of cannibalism.

"Although the first doses of blood were administered yesterday after a tribal court order had been obtained, placing the patient under the temporary custody of the community, the boy died early this morning."

The preceding paragraphs are a parody on an actual item reported by the Associated Press: "Ann Arbor, Michigan, November 17 — A 14-year-old boy died last night, two days after receiving a blood transfusion over the objections of his parents, who said it violated the family's religious beliefs. Etc., etc."

From time to time, similar incidents have been reported by the press. And there are bound to be more of them, as long as religious sects continue to propagate anti-transfusion beliefs.

People who do not share such beliefs find it hard to keep from asking, "Must we stand by, powerless to act, while human life is so needlessly sacrificed?" But difficult as it may be to avoid this question, it is even more difficult to find a completely satisfactory answer.

Too many separate issues are involved. Ethically, there is the question of where the physician's responsibility for the well-being of his patient ends, or whether the physician's responsibility may ever supersede that of the patient, and if so, under what specific circumstances and by what means. Philosophically, there is the question of how far one may go in opposing measures to save his own life before he becomes guilty of willful self-destruction — or, in the case of another's life, guilty of murder. And if opposition to a certain life-saving measure is a matter of conscience, would a violated conscience be worse than suicide or murder? Politically, there is the matter of the individual's constitutional liberty to hold whatever religious beliefs he may choose for himself. Can society with impunity place temporary restraints on this freedom by obtaining court orders to set aside certain beliefs?

Important as all these issues are, however, the problem, as defined by those who conscientiously object to blood transfusions, is basically a religious one. And, since they object on the basis of certain beliefs which are alleged to be drawn from the Holy Bible, the issue to be resolved is essentially a theological one.

Unfortunately, the Bible and so-called Biblical theology are not necessarily always identical. There are almost as many divergent Biblical beliefs as there are Bible students. And each seems curiously able to quote the same Scripture in support of his own peculiar belief.

There is no limit to what the Bible may be made to prove. For example, one zealous preacher, speaking before a convention of hairdressers, was eager to prove that the popular, casual coiffures enjoy Scriptural sanction. He referred to Matthew 24:17, quoting the words: "Top not (topknot) shall come down." Another

*Director, Southwest Blood Bank of Little Rock, Arkansas.

once addressed a gathering of newspaper editors and based his remarks on the 'journalist's text,' Mark 2:4, "They could not come nigh unto him for the press."

The following are some of the Biblical passages which are quoted by those who object to blood transfusions on religious grounds: Genesis 9:3-4, "Every moving thing that liveth shall be meat for you; even as the green herb have I given you all things. But flesh with the life thereof, which is the blood thereof, shall ye not eat." Leviticus 17:11-12, "For the life of the flesh is in the blood; and I have given it to you upon the altar to make an atonement for your souls: for it is the blood that maketh an atonement for the soul. Therefore I said unto the children of Israel, No one of you shall eat blood, neither shall any stranger that sojourneth among you eat blood." Deuteronomy 12:16, "Only ye shall not eat the blood; ye shall pour it on the earth as water." Acts 15:29, "That he abstain from meats offered to idols and from blood and from things strangled: from which, if ye keep yourselves, ye shall do well."

From these and similar statements of the Bible it has been deduced that blood is sacred; that blood dare not be eaten; that blood transfusions are a form of intravenous feeding and, hence, a manner of eating blood; and that blood transfusions are therefore prohibited by God.

This anti-transfusion belief contains both logical and theological flaws. But it would be a serious mistake to assume that mere logic and theology will be sufficient to dispel the hemophobia of people who have already subscribed to this belief. It simply is not the nature of religious conviction that it be frankly open to the possibility of counter-conviction.

Professed beliefs, however, are not always as genuine and deep-rooted as they may appear to be. Severe tests of faith not only reveal the heroes and expose the hypocrites, but they also produce defections. And defection can be a two-way street — not only from truth to the denial of it, which is always reprehensible, but also to truth from the denial of it, which is always wholesome and desirable, especially in the case of a patient who, on the basis of an untenable religious belief, would deny himself the blood transfusion he so desperately needs. For his sake, in order to be able to give him light when his own lamp flickers and fails, it is well to be conversant with the pertinent logical and theological facts.

1. The only point of similarity between intravenous feeding and the transfusion of blood is the intravenous aspect of both procedures. And neither one is in any respect the equivalent of eating. These are not questions of religion, but purely and simply a matter of semantics in reference to certain medical procedures and physiological functions.

2. Every Biblical prohibition against the eating of blood is in reference only to the blood of animals, specifically against the eating of the animal's flesh, if the blood had not been properly drained from it. There is not one Biblical reference to the tranfusion of human blood.

3. Consistent theology would require that adherence to the Biblical prohibition against blood would be accompanied by similar recognition of related prohibitions against animal fats and certain meats.

4. The divine purpose of the Biblical prohibition against eating blood is clearly stated in Leviticus 17:11-12, viz., that the blood of animals was designated to be used in the sacred rites associated with atonement, and therefore was not to be profaned by a common usage in eating.

5. The ceremonial laws (not moral laws) of the Old Testament, including also the prohibition against eating blood, were abrogated by Christ, Colossians 2:17-17, "Let no man therefore judge you in meat, or in drink, or in respect of an holy day, or of the new moon, or of the Sabbath days: which are a shadow of things to come; but the body is of Christ."

6. Judaism, still adhering to the precepts of the Old Testament, particularly in reference to abstaining from the eating of blood, does not condemn the medical practice of transfusing blood.

7. Using the strange 'logic' and 'theology' of the conscientious objectors to blood transfusions — that one's blood is his life and therefore sacred, and that it is wicked to transfuse one's blood into the veins of another for the purpose of sustaining his life — it would also be possible to 'prove' that the medical practice of transfusing blood not only has Biblical sanction, but is most highly commended by Christ, who said, "Greater love hath no man than this, that a man lay down his life for his friends," John 15:13.

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CEREBRAL VASCULAR SURGERY*

PRINCIPLES OF TREATMENT

by

John R. Green, M.D., F.A.C.S.**

KNOWLEDGE about vascular diseases of the brain has evolved slowly.

HISTORICAL ASPECTS

Claudius Galen,(1) a Greek, who was born in Pergamum in 130 A.D. and physician to the Roman Emperor Marcus Aurelius, taught that *hemorrhage* in the brain disturbs the normal flow of animal spirits into the organs of motion and sensation resulting in hemiplegia and unconsciousness. Anatomically, the Galenic conception of the rete mirabile, transferred from the ungulate brain to man, and subserving the formation of animal spirits dominated medical thinking for the next 140 years. Even Vesalius's(2). Tabulae Sex, published in 1538 showed a diagramatic rete mirabile. Wepfer(3), in 1658 gave an excellent description of cerebral hemorrhage and described accurately the blood vessels at the base of the brain. Two decades later, Sir Thomas Willis(4) described what is now known as the circle of Willis. Ruysch,(5) in 1721, demonstrated the ubiquity of the vascular supply of the brain by arterial injection techniques. Splendid figures of the venous drainage of the brain had been provided earlier by Vesalius, in 1543, and by Highmore in 1651. Cerebral embolism and thrombosis were not known until the early part of the 19th century.

Aneurysm is mentioned in the works of Aetius(6) in the 6th century, and the term *arteriovenous aneurysm* is attributed to William Hunter (7) in the 18th century. Many descriptions, including careful neurological data, of aneurysms of the base of the skull and brain began to appear in the early part of the 19th century. Coe and Swayne(8) are believed to be the first to ligate the carotid artery in the neck for intracranial aneurysm with success in 1855. Because of failure of ligation of the carotid artery in the neck to cure a case of pulsating exophthalmos, Zeller(9) of Germany, in 1911 first attempted ligation of the internal carotid artery within the cranium but the patient died from hemorrhage when an assistant accidentally grasped the ligature with a hemostatic forceps and avulsed it. Hamby and Gardner(10) in 1933, unaware of this case, first successfully ligated the internal carotid intracranially with silk ligatures after ligation of the internal carotid in the neck, in a case of carotid cavernous fistula. Two years later, Dandy(11) reported the use of silver hemostatic clipping of the intracranial portion of the internal carotid artery. Following this development, intracranial aneurysms have been cured by clipping the neck of the sac or by clipping the afferent and efferent vessels.

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**Chairman, Department of Neurology and Neurological Surgery, St. Joseph's Hospital, Phoenix, Arizona.

Two more recent advances in techniques have added to the safety and accuracy of cerebral vascular surgery: (1) *Cerebral angiography,* introduced in 1927 by Egas Moniz(12) and perfected by many other workers, has gradually assumed a major role in the objective diagnosis and localization of vascular lesions of the brain. This procedure is indicated in almost all patients who have spontaneous subarachnoid hemorrhage, in all cases of pulsating exophthalmos, and in the majority of patients suspected of having cerebral thrombosis, in order to exclude such surgical conditions as aneurysm, neoplasms and other space-occupying lesions. Angiography, carotid and vertebral, can demonstrate all areas of the brain and is indicated as soon as the patient's condition warrants additional investigation to make an accurate diagnosis. (2) *Hypothermia* has been particularly useful in cerebral vascular surgery in that cerebral metabolism decreases directly with lowering of the temperature. Safe, monitored methods of hypothermia have recently been developed by Botterell and associates.(13) The technique allows the neurosurgeon to operate with the patient's temperature at 29° C., and to be able to temporarily occlude both carotids or any portion of them and the vertebrals for as long as fifteen minutes while the vascular malformation itself is being eradicated. Hypothermia, in the hands of an experienced team, is remarkably safe and free of complications for the patient.

CASE REPORTS

Three patients are briefly presented to illustrate representative clinical problems.

1. *Carotid-cavernous fistula.* A. R. sustained a basal skull fracture in December 1957 and subsequently developed proptosis of the right eye and a roaring sound synchronous with his heart beat in the same area. He was unable to abduct his right eyeball following the accident. Examination in July of 1958 revealed a normal 12 year old who had proptosis of the right eye, congestion of the veins surrounding the right eye with palpable thrill and audible bruit. He had a right abducens palsy. Pulsating exophthalmos was absent.

Right cartoid angiography on July 28, 1958 verified the clinical diagnosis of carotid-cavernous fistula. Left carotid and vertebral aniography were done to study collateral circulation and possible feeders to the fistula. It was determined that the right carotid artery was the only vessel contributing to the fistula.

In view of a negative Matas test (no clinical symptoms associated with carotid compression) and the fact that the thrill and bruit were temporarily eliminated with this test, the common carotid artery was ligated.

The bruit and thrill disappeared immediately and the proptosis decreased during the next month. During April of 1959, the preoperative symptoms and signs recurred and "trapping" of the carotid-cavernous fistula was decided upon.

On June 1, 1959, under hypothermia at 30° C., the right internal carotid artery was ligated in the neck and occluded with Olivecrona clips intracranially. This boy has made an uneventful recovery, is back in school and taking part in sports. (Figs. 1A and 2A show pre-operative angiograms; Figs. 1B and 2B show Olivecrona clips on internal carotid artery.)

2. *Arterial-venous racemose aneurysm, left middle cerebral artery, with left temporal lobe hematoma.*

R. W. had two episodes of spontaneous subarachnoid hemorrhage late in December of 1958. Examination on January 6, 1959 revealed a lethargic, asphasic, 38 year old male, who had a slight right hemiparesis and left oculomotor palsy. His neck was stiff and the spinal fluid was bloody – its pressure being 380 mm. H_2O. History was obtained of a previous episode of similar symptoms in 1952, but a definite diagnosis was not established at that time.

Bilateral carotid angiography on January 6, 1959 disclosed a large arteriovenous aneurysm of the left middle cerebral artery which was displaced upward. The left anterior cerebral artery was displaced across the mid-line. The diagnosis listed above was made.

On January 8, 1959, under hypothermia to 89° F., and the usual monitoring by the Autotherm, cardiac monitor, and esophogeal and rectal thermometers, a large left temporal lobe hematoma was evacuated (4 ounces of fluid) and the arteriovenous racemose anurysm was excised from its contributing vessels. Tracheotomy was done to smooth the post-operative course.

He resumed his job in March of 1959 and has been well since. His only neurologic deficit as of November 15, 1959 was a partial right upper quadrant hemianopsia which does not interfere

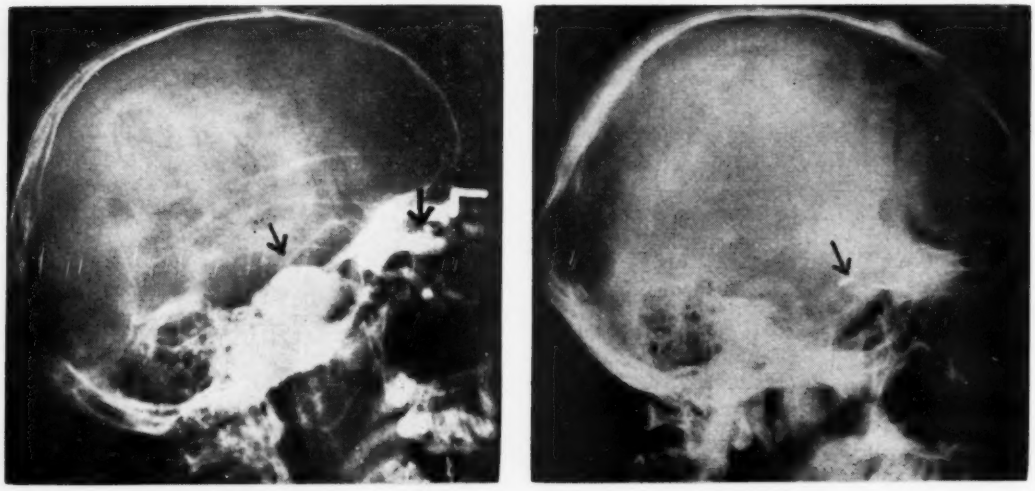

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Fig. 1

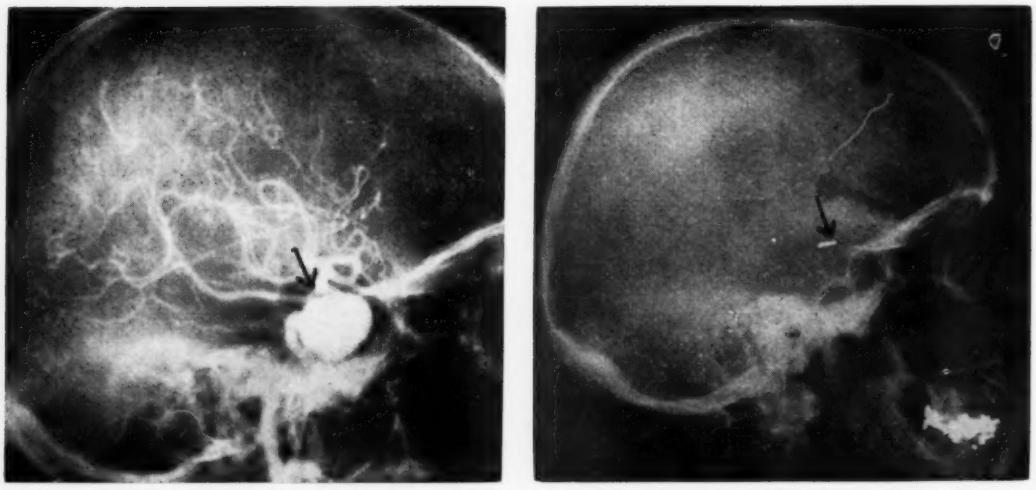

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Fig. 2

with his normal activities.

3. *Saccular aneurysm of left internal carotid artery — intracranial portion.*

H. D. was referred by her psychiatrist because of a recent onset of giddy spells and blurnirg of vision superimposed upon a chronic severe anxiety state. On May 6, 1958, this 61 year old lady showed defects in the superior temporal quadrant of each visual field, and corrected visual acuities of 20/20 bilaterally. She showed no other signs other than an extreme anxiety state which was refractory to medications and psychiatry. She had two brief episodes of diplopia during August of 1958 but showed no extraocular muscle palsy. X-rays of the skull showed suggestive ballooning of the sella turcica.

Bilateral carotid angiography was done on August 21, 1958 showing a large saccular aneurysm on the infraclinoid portion of the left internal carotid artery just below the junction of the posterior cerebral artery.

Ligation of the left common carotid artery was done on August 26, 1959, after compression of this artery digitally for periods of time up to

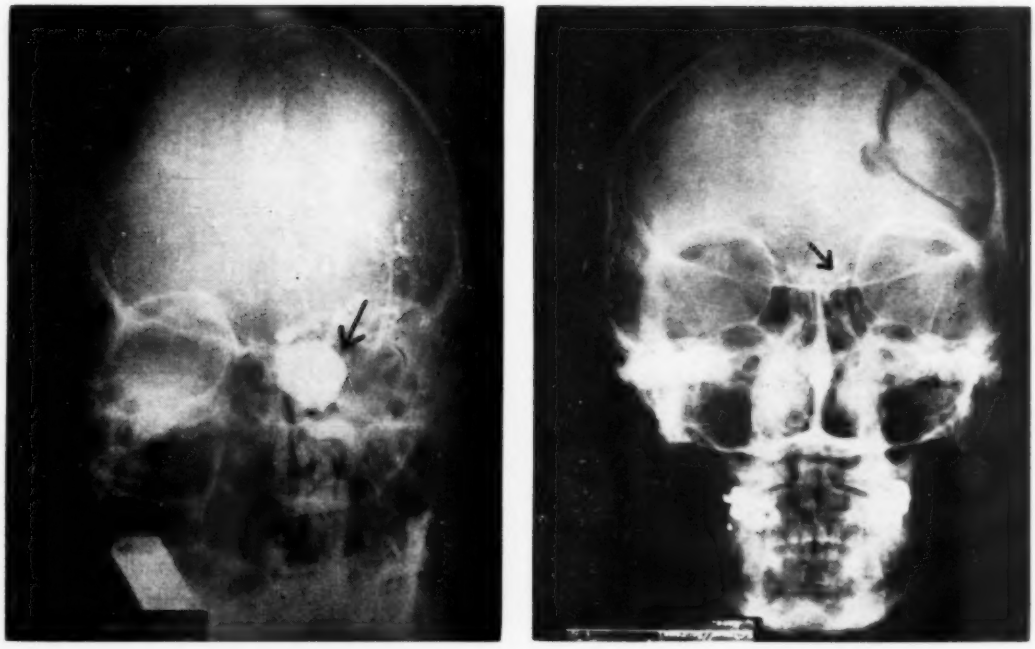

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Fig. 3

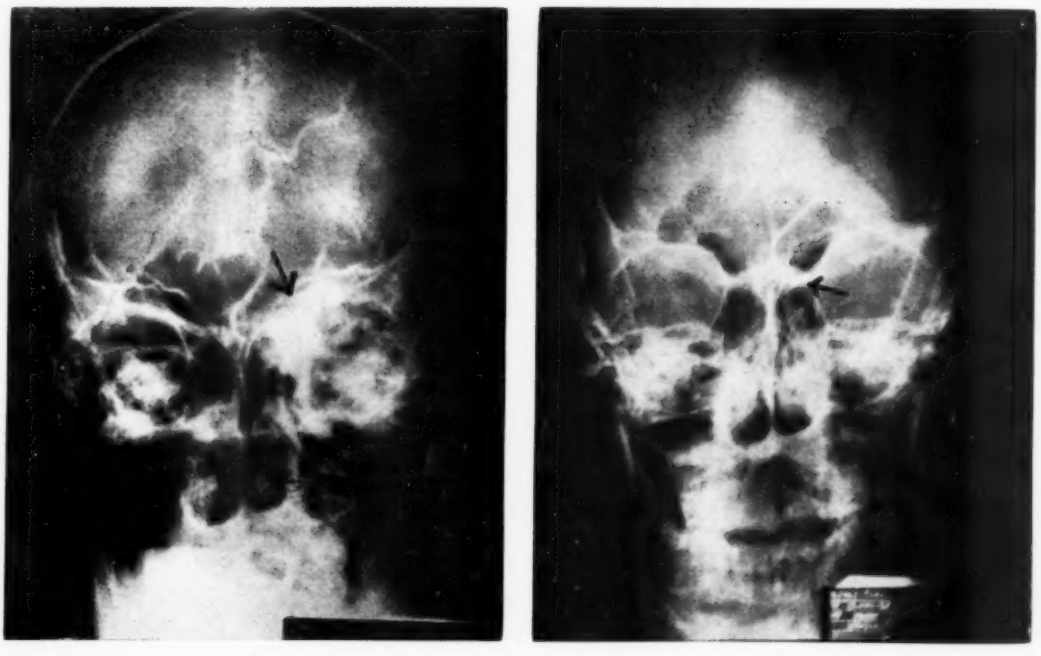

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Fig. 4

30 minutes each day (Matas test) created no symptoms. Within four days it was apparent that the aneurysm must be increasing in size because of the development of increasing pain behind the left eye and the appearance of a left oculomotor palsy.

On September 10, 1958, under hypothermia to 30.5° C., the left internal carotid artery was ligated in the neck. The infraclinoid saccular aneurysm was then "trapped" by means of an Olivecrona clip just above it on the intracranial portion of the internal carotid artery. (Figs. 3 and 4)

During the next three months she made an uneventful recovery, except for the persistence of the left ocularmotor palsy and the worsening of the chronic anxiety state. Consulting psychiatrists recommended psychosurgery. Bilateral orbitofrontal lobotomy was done on November 4, 1958. Her anxiety disappeared and no detectable intellectual defect resulted from this selective lobotomy procedure. By December of 1958 the oculomotor palsy began to recover. Her recovery has been complete since May of 1959 and she has resumed golfing. She was last examined on November 15, 1959 and showed no detectable neurologic deficit.

PRINCIPLES OF MANAGEMENT OF CEREBRAL VASCULAR DISEASE

1. Accurate clinical history and examination.

2. Neurological examinations for localization of the lesion and determining its nature.

3. Skull x-rays.

4. Lumbar puncture with recording of the spinal fluid pressure, and examination of the fluid for blood, cells, total protein and serologic data.

5. Carotid angiography and sometimes vertebral angiography, if subarachnoid hemorrhage is present. The optimal time for aniography is usually seven to fourteen days after the hemorrhage has occurred.

6. Anticoagulants only if a conclusive diagnosis of intermittent insufficiency or embolism in the cerebral circulation is determined. Air studies, electroencephalogram and angiography may be necessary to exclude neoplasm.

7. Ligation of the carotid artery in the neck and/or intracranially, depending on the location and nature of the cerebral vascular anomaly.

8. Bed rest for six weeks following spontaneous subarachnoid hemorrhage if surgical treatment is not feasible.

9. Physical medicine and rehabilitation therapy as soon as the patient's condition permits.

CONCLUSIONS

1. Each patient who is considered to have any type of cerebral vascular accident should have an early accurate diagnosis before treatment is instituted.

2. Cerebral vascular surgery has matured sufficiently during the past twenty years to occupy an important place in the treatment of many cerebral vascular diseases — especially intracranial aneurysms, arteriovenous aneurysms and carotid-cavernous fistulas. Such treatment administered by an experienced team including the neurologist, neurosurgeon, neuroradiologist, and anesthesiologist has materially reduced the morbidity and mortality of these potentially catastrophic conditions.

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NOTE: The author is indebted to Dr. A. Ortiz of Phoenix for the Spanish translation of this material.

CIRUGÍA CEREBRO-VASCULAR*

PRINCIPIOS DE TRATAMIENTO

por

John R. Green, M.D., F.A.C.S.**

EL CONOCIMIENTO de las enfermedades vasculares del cerebro ha evoluoionado lentamente.

Claudio Galeno,(1) Griego, nacido en Pérgamo en el año 130 A.D. ye médico de cabecera del emperador Marco Aurelio, enseñaba a sus discípulos que la hemorragia en el cerebro obstruía el flujo normal de los fluídos animales hacia los órganos de movimiento y de sensación trayendo como resultado la hemiplegia y la pérdida del conocimiento. El concepto galénico de la "rete mirabile," fuente originaria de los fluídos animales y trasmitida del cerebro de los ungulados al hombre dominó el pensamiento médico durante los 1400 años subsiguientes. Aún en la Tabulae Sex(2) de Vesalio, publicada en 1538, apareciá un diagrama de la rete mirabile. Wepter(3) en 1658 describió en forma excelente la hemorragia cerebral y también los vasos sanguineos de la base del cerebro. Veinte años más tarde, Sir Tomas Willis(4) describió lo que hoy día se conoce como el círculo de Willis. Ruysch,(5) en 1721 demostró la riqueza vascular del cerebro con técnicas de inyección. El drenaje venoso del cerebro había sido ya demostrado magistralmente por Vesalio en 1543 y por Highmore en 1651. La trombosis y el embolismo cerebral no se reconocieron hasta principios del siglo diecinueve.

El aneurismo se menciona en los trabajos de Aetius(6) en el siglo seis, y el término "aneurismo arterio-venoso" se le atribuye a William Hunter(7) en el siglo dieciocho. A principios del siglo diecinueve empezaron a aparecer descripciones de aneurismos de la base del craneo y del cerebro con información neurológica bastanta precisa. Se cree que Coe y Swayne fueron los primeros en ligar con éxito la carótida en el cuello para corregir un aneurismo intracranial en 1855. En 1911 Zeller hizo un atentado a ligar intracranialmente la carótida interna de un paciente con un exoftalmo pulsante cuando la previa ligadura de la carótida común no corrigió el defecto. El paciente murió de hemorragia cuando un ayudante desgarró accidentalmente la arteria al halar la ligadura. Hamby y Gardner en 1933, aunque desconcían ese caso, fueron los primeros en ligar con éxito la carótida interna intracranialmente con seda después de ligar la carótida interna en el cuello en un caso de fístula cavernosa de la carótida. Dos años más tarde Dandy(11) usó por primera vez la grapa hemostática de plata para ligar la porción intracranial de la carótida interna. Después de esto los aneurismos intracraniales se han curado atando el cuello del saco o los vasos aferentes y eferentes.

*Trabajo presentado en la convencion anual de la Sociedad Medica de los Estados Unidos de Norteamerica y de Mexico en el Hotel Valley Ho, Scottsdale, Arizona, 4 de diciembre de 1959.

**Director, Depto. de Neurologia y Neuro-cirugia, St. Joseph's Hospital, Phoenix, Arizona.

La cirugía cerebro-vascular se ha afianzado más con dos avances en la técnica a saber: (1) La angiografía cerebral usada por primera vez por Egas Moniz(12) en 1927 y perfeccionada por muchos otros poco a poco ha ido tomando más auge en el diagnóstico objectivo y en la localización de lesiones vasculares del cerebro. Este procedimiento está indicado en todo caso de hemorragia sub-aracnoidal y de exoftalmos pulsante así como en la mayoría de los pacientes en que se sospeche la trombosis cerebral, a fin de excluir condiciones como aneurismos, neoplasmas y otras lesiones ocupantes de espacio. Las angiografías, carótida y vertebral, demuestran todas las areas del cerebro y se indican tan pronto como la condición del paciente permita más investigaciones para hacer un diagnóstico preciso. (2) La hipotermia ha sido de gran utilidad en la cirugía cerebro-vascular debido a que el metabolismo cerebral disminuye en relación directa a la baja en temperatura. Botterel y sus socios últimamente han perfeccionado métodos de hipotermia que no tienen riesgo mayor para el paciente a la par de ser efectivos. La técnica permite que el cirujano opere con la temperatura del paciente un unos 20° C. de manera que se pueden ocluir temporalmente ambas carótidas o cualquier porción de ellas por un lapso de hasta quince minutos mientras se extrae o se corrige el defecto vascular. La hipotermia en manos de un "team" competente es una técnica inocua y libre de complicaciones para el paciente.

CASOS CLÍNICOS

A continuación se presentan tres casos ilustrando problemas clínicos típicos.

1. *Fístula carótido – cavernosa* – El paciente A. R., niño de 12 años de edad, sufrió una fractura basilar del craneo en diciembre de 1957 y más tarde desarolló proptosis del ojo derecho y un soplo vascular sobre el ojo se que sincronizaba con el latido del corazón. No podía abducir el ojo después del accidente. Al examinarlo en julio de 1958 se le encuentra la proptosis, congestión de las venas alrededor del ojo y un soplo con vibración palpable (thrill). El músculo abductor derecho estaba paralizado. No se le encontró exoftalmo pulsante.

Los estudios angiográficos hechos en julio 28 de 1958 confirmaron el diagnóstico clínico de fístula carótido-cavernosa. Se le hicieron angiografías de la carótida y la arteria vertebral izquiredas a fin de estudiar la circulación colateral y descubrir cualesquiera vasos abastecedores de la fístula. Se decidió que la arteria carótida derecha era la única abastecedora de la fístula.

La prueba de Matas fué negativa (ausencia de síntomas al comprimir la carótida). El soplo y el "thrill" desaparecieron temporalmente con esta prueba. Basándonos en estas observaciones decidimos ligar la carótida interna.

El "thrill" y el soplo desaparecieron inmediatamente y la proptosis disminuyó durante el mes subsiguiente. En abril de 1959 los síntomas preoperatorios volvieron a manifestarse. Entonces decidimos interrumpir la fístula ("trapping").

En junio 1 de 1959, bajo hipotermia de 30° C. se le ligó la carótida interna en el cuello y se le colocó una grapa de Olivecrona en la arteria intracranialmente. El paciente se ha restablecido por completo y ya regresó a la escuela y participa hasta en deportes. (Fig. 1, 2)

2. *Aneurismo en racimo, arteria cerebral media de la izquierda con hematoma del lóbulo temporal izquierdo.*

El paciente R. W. tuvo dos derrames subaracnoidales espontaneos en diciembre de 1958. Al examinarlo en enero de 1959 se encontró un hombre de 38 de edad letárgico, afásico con ligera hemiparesis derecha y paralisis del oculomotor izquierdo. Tenía rigidez de la nuca y se le encontró sangre en el fluído cefaloraquideo. La presión era de unos 380 mm. de agua. La historia reveló que el enfermo había sufrido un episodio similar en 1952, pero en aquella ocasión, no se hizo un diagnóstico definitivo.

La angiografía bilateral de las carótidas en enero 6 de 1959 demostró un aneurismo arteriovenoso grande en la arteria cerebral media de la izquierda, desplazado hacia arriba. La arteria cerebral anterior izquierda se había desplazado hacia el lado derecho del cerebro. El diagnóstico ya mencionado se hizo.

En enero 8 de 1959 se le evacuó un hematoma del lóbulo temporal izquierdo y el aneurismo arterio-venoso fué extraído de sus vasos abastecedores. La operacion se hizo bajo hipotermia de 89° F. y bajo supervisión del "autotherm," el monitor cardiaco, y con termometros en el esófago y en el recto.

Para marzo de 1959 ya el paciente estaba trabajando y se ha sentido bien hasta la fecha.

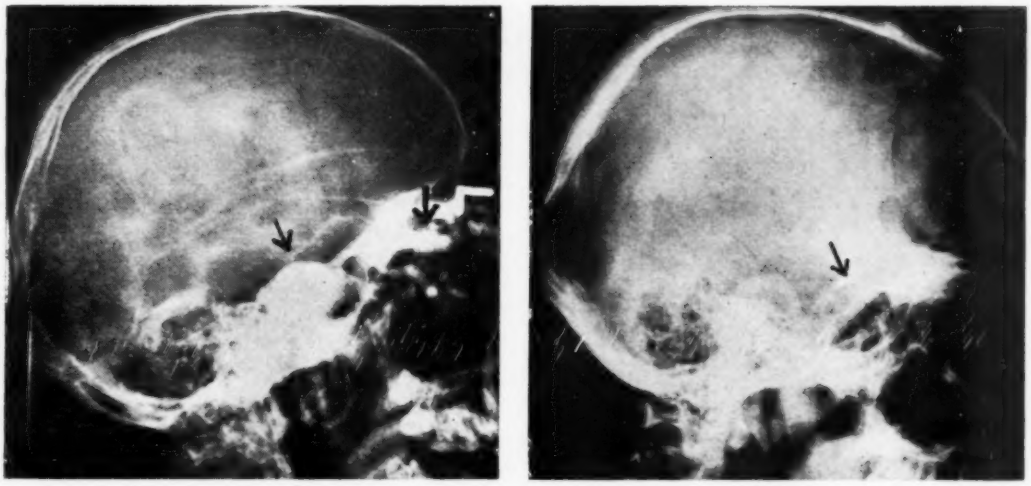

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Fig. 1

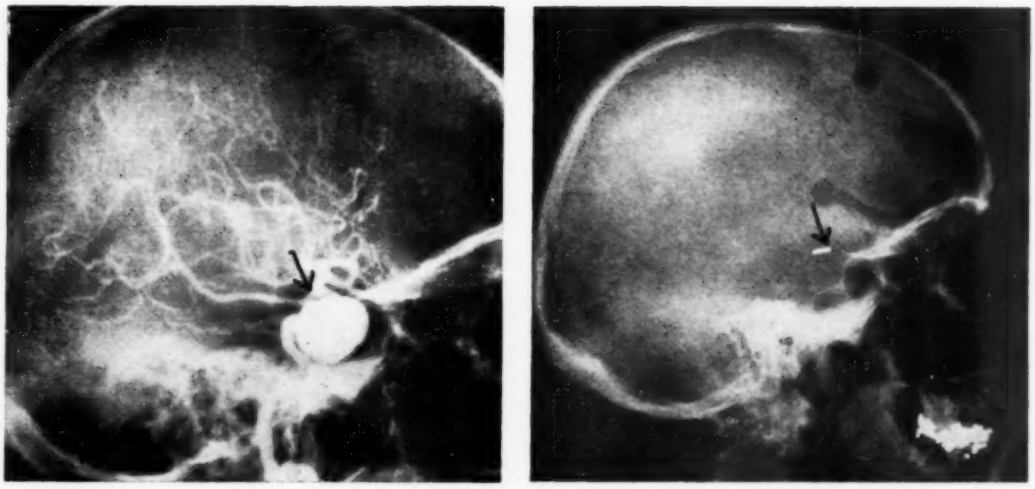

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Fig. 2

La única deficiencia neurológica que se notó en noviembre de 1959 fué una hemianopsia parcial del cuadrante superior derecho. Este defecto, sin embargo, no obstaculiza sus actividades normales.

3. *Aneurismo sacular de la carotida interna izquierda – porción intracranial.*

La paciente H. D. de 61 años de edad, vino a nosotros por referencia de un psiquiatra. Ella se quejaba de mareos y de que se le empañaba la vista. Ademas sufría de un estado de ansiedad crónico y severo. En mayo de 1958 se le encontraron defectos bilaterales en el cuadrante temporal superior de la vista pero mantenía una agudeza de 20/20 en ambos ojos. No manifestaba más síntomas que la ansiedad severa que no había respondido ni a drogas ni al tratamiento psiquiátrico. En agosto 26 de 1958 había tenido dos breves episodios de diplopia pero nunca manifestó parálisis de los músculos extra-oculares. En las radiografías del craneo la silla turca aparentaba estar inflada.

En agosto de 1958 se le hizo una angiografía y se la descubrió un aneurismo grande en forma

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Fig. 3

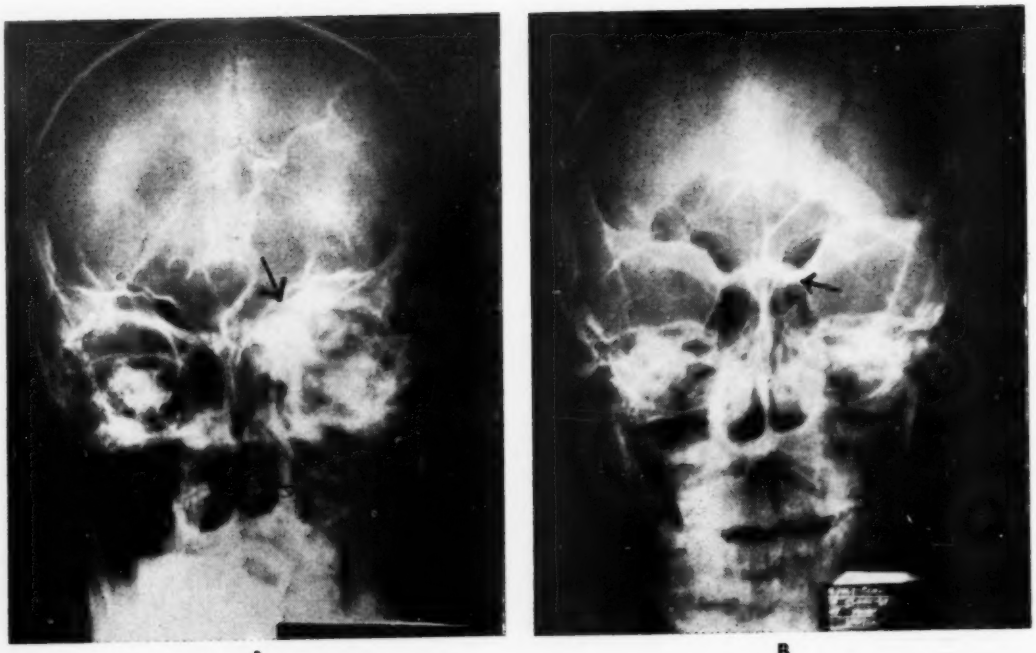

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Fig. 4

sacular en la porción infraclinoidal de la arteria carótida interna junto a la unión de la arteria cerebral posterior. En agosto de 1959 se le ligó la carótida común izquierda después de hacerle la prueba de Matas (compresión digital de la carótido) cada día por términos de hasta 30 minutos. Como a los cuatro días la enferma comenzó a sentir dolor setrás del ojo izquierdo y empezó a manifestar parálisis del oculomotor izquierdo.

El día 10 de septiembre de 1958, bajo hipotermia de 30.5° C., se le ligó la carótida interna en el cuello. El aneurismo sacular infraclinoidal fué interrumpido con una grapa de Olivecrona colocada en el cuello superior del saco en la porción intracranial de la arteria carótida interna. (Fig. 3, 4)

En los tres meses subsiguientes la enferma se restableció sin novedad a excepción de la parálisis del oculomotor izquierdo y el empeoramiento de la ansiedad. Los psiquiatras de consulta recomendaron psicocirugía. En noviembre 4, 1958 se le hizo una lobotomía bilateral orbitofrontal. La ansiedad desapareció y no se notó defecto intelectual alguno después de la operación. Para diciembre de 1958 ya comenzaba a desaparecer la parálisis del oculomotor. Su restablecimiento ha sido completo desde mayo de 1959 y la paciente ya hasta juega al golfo. En el examen de rutina del 15 de noviembre de 1959, no se hallaron deficiencias neurológicas.

LOS PRINCIPIOS BÁSICOS EN EL MANEJO DE LAS ENFERMEDADES CEREBRO-VASCULARES

1. Haga una historia clínica precisa y un examen completo.
2. Haga los exámenes necesarios para localizar la lesión y determinar su saturaleza.
3. Estudios radiográficos del craneo.
4. Haga punción raquidea midiendo la tensión intraraquidea y ordene examen del líquido con recuento de eritrocitos, leucocitos, proteína y serología.
5. Haga angiografía carótida y si es necesario haga angiografía vertebral si hay hemorragia subaracnoidal. El major tiempo para la angiografía generalmente es entre los siete y los catorce días después de la hemorragia.
6. Use los anticoagulantes solamente cuando haya hecho un diagnóstico definitivo de insuficiencia intermitente de la circulación cerebral o si sospecha un embolismo. La neumoencefalografía, el electro-encefalograma y la angiografía se hacen cuando se sospecha un neoplasma.
7. Se liga la carótida en el cuello, intracranialmente, o en ambos puntos, de acuerdo con a ubicación de la anomalía cerebro-vascular.
8. Haga que el enfermo permanezca en cama por seis semanas después de una hemorragia subaracnoidal si el tratamiento no es factible.
9. Instituya fisioterapia y rehabilitación tan pronto como la condición del enfermo lo permita.

CONCLUSIONES

1. Todo paciente en quien se sospeche un accidente cerebro vascular de cualquier clase debe ser sometido a todos los examenes necesarios, a fin de hacer un diagnóstico preciso antes de comenzar el tratamiento.
2. Por los adelantos alcanzados en los últimos veinte anos la cirguía cerebro-vascular ha alcanzado un lugar de suma importancia en el tratamiento de muchas condiciones cerebro vasculares, particularmente los aneurismos intracraniales y arterio-venosos y las fístulas carítido cavernosas. El tratamiento bajo la dirección de un grupo competente compuesto por un neurólogo ha reducido la morbilidad y la mortalidad de estas condiciones que pueden tener resultados catastróficos para el enfermo.

THE AVERAGE FEE CHARGED BY VARIOUS SPECIALISTS

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Obstetrician – Gynecologists	$6.03
Internists	5.64
Pediatricians	5.17
Surgeons	4.97

(from New Medical Materia, April 1960)

Hysterectomy*

Daniel G. Morton, M.D.

Los Angeles, California

In defense of a much maligned procedure, there are many excellent reasons for performing hysterectomies. Mortality is low. Careful evaluation is always needed and a thorough explanation of the procedure to the patient is a must if psychotic and neurotic reactions are to be avoided.

HYSTERECTOMY may seem to be a somewhat old and hackneyed subject. Indeed one might wonder what there is to be said about it that hasn't already been said. To some extent this is true, yet there are controversial aspects even at this present time which make the subject a matter of interest to us all. Every one of us is familiar with the diatribes which have been written concerning "unnecessary" hysterectomies and "commercial" hysterectomies. The uterus has been protected in a manner unparalleled for any other organ. The removed uterus has been discussed by tissue committees in extenso, unless obvious pathology has been present. The right to perform a hysterectomy has been limited to certain qualified individuals, and in addition consultations regarding the advisability of the operation have been demanded in most hospitals regardless of the surgeon's qualifications. It has almost seemed as if the uterus were a sacred organ. There has been overprotection, I believe, because in the vast majority of instances the hysterectomies have been proposed for very reasonable indications and performed in an adequately skillful manner. It has been decidedly exceptional when a hysterectomy has been patently unnecessary or solely commercial.

At this time I propose to share with you my own distillate of beliefs regarding this subject. I would expect that most of us would list much the same indications and subscribe to the same principles of management, though of course we cannot all look at any given problem in exactly the same manner. With a common background of knowledge, we should be able to come to roughly the same conclusions, nevertheless.

Objectives

One must keep clearly in mind the objectives of a hysterectomy. The principal objective is to relieve a condition which cannot be treated as satisfactorily in any other way. In order to make the decision that hysterectomy is indicated, one needs only to be conscientious. It is essential that thorough and careful consideration be given to the patient from the point of view of the presenting pelvic condition and from the point of view of the general condition in order to avoid undue hazard. We need only to ask ourselves the question: Under the circumstances, would we want to have the operation performed upon our wives or our daughters? When that question can be answered in the affirmative, no one can ask for more.

*Presented at the Ogden Surgical Society meeting, May 20-22, 1959, Ogden, Utah. Dr. Morton is Chairman, Department of Obstetrics and Gynecology, University of California, Los Angeles. (Reproduced through cooperation with the ROCKY MOUNTAIN MEDICAL JOURNAL.)

Advantages

In order to crystallize our thoughts regarding hysterectomy, I should like first to list the advantages of hysterectomy:

1. It removes an organ containing a tumor such as a myoma or a cancer.

2. It removes the source of excessive bleeding, due either to a tumor or to a functional disturbance.

3. It prevents further menstruation (under some circumstances this is an advantage).

4. It prevents further pregnancies (advantageous in some circumstances and the exact opposite in others).

5. It is prophylactic against cancer of the uterus. In my opinion, the prophylactic value of hysterectomy has been neglected in the past. In practice we have spoken of it retrospectively, comforting ourselves with the knowledge that it is at least prophylactic when we have removed a uterus and failed to find the expected pathology; prophylaxis has rarely been considered an indicating factor.

6. It produces a sense of relief at the abolition of the necessity for contraception.

Disadvantages

The advantages are not applicable to all cases; we must also look at the other side of the picture and consider what are the disadvantages of hysterectomy, as follows:

1. It prevents further childbearing, a distinct disadvantage under many circumstances.

2. It may have an adverse effect upon ovarian function. Most studies have shown that there is some adverse effect upon ovarian function though this is not an invariable fact. Whether impairment of blood supply or some unknown mechanism is responsible is not known. Follow-up studies have shown somewhat premature termination of ovarian function, as judged by the appearance of menopasual symptoms, following hysterectomy performed upon women in their twenties or early thirties.

3. It may produce an unfavorable psychologic reaction. This occasional development is extremely important and is often due to our failure to communicate properly with the patient ahead of time. We have not prepared the patient with information regarding the consequences of a hysterectomy, both of a positive nature and a negative nature.

4. There is a hazard in an operation like hysterectomy, though it is true that the mortality today is low.

Other considerations

The advantages and disadvantages which have been listed must be balanced one against the other in the light of the following considerations:

1. The urgency of the symptoms. Sometimes the operation can be postponed because of the mild character of the symptoms and sometimes it is unwise to postpone it because of the severity and urgency of the symptoms.

2. The age of the patient must obviously be considered since it is much more important to preserve the uterus in a young woman than it is in those who are nearing the menopause.

3. The marital status and parity of the patient must both be considered.

4. The general condition of the patient must of course play an important role.

5. The patient's emotional balance. I am certain that women who are inclined to be easily upset emotionally are very much more likely to be upset by hysterectomy than those who are more phlegmatic.

Indications

The most generally acceptable indications are listed in Table 1. Each will be discussed briefly.

TABLE 1

Indications for hysterectomy

Myoma
Sarcoma
Adenomyosis
Menorrhagia
Carcinoma of Cervix
Carcinoma of Endometrium
Chorionepithelioma, Chorioadenoma destruens
To effect sterilization
Incidental to operative removal of tubes and ovaries for diseases of these structures (e.g., P.I.D., ovarian carcinoma, etc.)

Myomas of the uterus constitute an indication for hysterectomy when they cause excessive and/or prolonged bleeding. This occurs in not over one-third of the patients who have myomas. Myomas may demand hysterectomy because of increasing size. When the uterus has become enlarged to a size in excess of a three and one-half months' pergnancy, hysterectomy is generally advisable, though sometimes in young women myomectomy is preferable. Rapid growth of myomas indicates hysterectomy for fear of sarcomatous degeneration. Small asymptomatic myomas in women nearing 50 years of age usually demand observation only. The incidence of

malignant degenration is low indeed, probably not over one-half of one per cent

Sarcoma of the uterus is a rare tumor and is usually not diagnosed until the uterus has already been removed for a supposed myoma or a bleeding polyp. Whenever the diagnosis is made peroperatively on the basis of rapid growth or of a bleeding polypoid mass protruding from the cervix, hysterectomy is indicated. Because these tumors frequently spread by the blood stream, there is no point in carrying out a locally radical operation like the Wertheim operation. Either the simple removal of the entire uterus (plus tubes and ovaries) cures the patient or, because of blood stream metastases, it does not. The prognosis is poor.

Adenomyosis of the uterus is often associated with menorrhagia and a clinically symmetrically enlarged, thick-walled uterus. Only ocasionally is dysmenorrhea a symptom. As with sarcoma, adenomyosis is often diagnosed only upon examination of the specimen in the pathology laboratory. Hysterectomy is often demanded because of the severe degree of menorrhagia, however.

Menorrhagia. This indication is one of the most controversial of all, since it is difficult to fix a point beyond which more conservative measures become no longer useful. It is controversial also because it often occurs in young women in whom removal of the uterus would be most undesirable because it is often associated with no demonstrable pathologic change and because in many instances menorrhagia can be controlled by a well conceived regimen of hormone therapy or by endometrial curettage. Nevertheless, there are patients, more particularly in the premenopausal and menopausal groups, in whom other methods have failed, for whom hysterecomy is the best solution regardless of the lack of pathologic findings. Patients with menorrhagia for whom hysterectomy is the best treatment probably constitute not more than 5 to 10 per cent of all patients with this complaint.

Carcinoma of the cervix is most widely treated by means of radiation. Certain gynecologists and surgeons are currently electing to treat Stage 1 cervical cancer by means of radical hysterectomy. In expert hands the results approach but do not exceed those of radiation. However, for Stage 0 cervical cancer, also spoken of as carcinoma-in-situ, ordinary total hysterectomy with a one-inch vaginal cuff is considered sufficient and is the most widely approved method of treating this condition at this time.

Carcinoma of the endometrium requires total hysterectomy and bilateral salpingo-oophorectomy as the treatment of choice. The majority of authorities favor preoperative radium therapy six weeks before operation, but the superiority of the latter over hysterectomy alone has not been clearly established. It appears that preoperative radiation might be an advantage when the growth is bulky and/or poorly differentiated. When the uterus is only slightly enlarged or normal in size, and especially when the growth is superficial in the uterine cavity and well differentiated histologically, the value of pre-operative radiation is doubtful.

Whenever the diagnosis of chorionepithelioma of the uterus has been made, hysterectomy is indicated even though distant metastases have already occurred because of the strange manner in which the latter sometimes disappear when the parent tumor has been removed. Hysterectomy is also indicated for chorioadenoma destruens and indeed in some cases of ordinary hydatid mole when the condition represents a second occurrence and also when the patient has already "had her family" or is just plain old for child-bearing.

Hysterectomy is employed by some to effect sterilization at the time of a third, fourth or fifth Cesarean section. While I do not personally believe that it should be so used routinely, I do believe that it is the superior method of sterilization wherever the uterus is abnormal or the patient is more than 35 years of age. The reasons for this belief are (1) the certainty of the sterilization and (2) the prophylaxis provided against functional menorrhagia and uterine cancer especially. I do not like it for the younger women because it stops menstruation and may affect the ovaries adversely.

Hysterectomy is generally performed incidentally at the time of removal of the tubes and ovaries for diseases of these structures, such as pelvic inflammatory disease, endometriosis, and cancer, and this is a practice which I deem to be advisable. In the case of cancer, the uterus could be a repository for metatases or direct spread from tubes or ovaries, while in the case of inflammatory disease or endometriosis the presence of the uterus postoperatively might

preclude the possibility of adequate indicated estrogen therapy. Even in the case of uterine prolapse the removal of the uterus is usually merely to get it out of the way, allowing for a proper repair of the vaginal walls and the pelvic floor.

In Table 2 I have attempted a comparison of indications as reported in contemporary series of cases, though the differences in the methods of classifying indications makes it impossible to compare exactly. Nevertheless, I think it is apparent that practices in widely different areas of the country are similar, though there are some outstanding differences in material related to the economic status of the patients dealt with and the geographical areas represented.

TABLE 2
Comparison of indications

	Percentage of Total			
	Toronto General Hospital(1)	Private Toronto Hospital	Ochsner Clinic(2)	UCLA
Myoma	35	23	43	23.5
Endometrial Ca	12.5	8		11
Cervical Ca	4.5	0.5	10.5	21
Stage 0			7.5	13.4
Stage 1			3.3	2.3
Recurrent				5.7
Sarcoma				1.2
Chorio-carcinoma				0.6
Incidental	40	43.8		40.7
Prolapse	11	27		19.8
P.I.D.	10	3	6.2	4
Endometriosis	2.5	5	12.4	1.7
Ovarian tumor	7.5	4.25		14.5

Type of operation

So much for the indications for hysterectomy. I should now like to turn our attention to several other considerations relating to hysterectomy. The first of these is the type of operation. Vaginal hysterectomy has increased greatly in popularity in the last 10-15 years. The frequency of its use varies considerably in different areas and with the training of the individual doctors. Many uteri are removed vaginally today which would have been removed abdominally in the recent past. The original popularity of vaginal hysterectomy was based upon fewer complications and a lower mortality than for abdominal hysterectomy. While these differences used to exist, I doubt if they do today for cases of similar type. Any over-all comparison will always be in favor of vaginal hysterectomy because in the tough cases this operation is not attempted; the uterus is removed abdominally. Vaginal hysterectomy is particularly applicable to those cases in which there is uterine prolapse or in which simple vaginal repair is indicated also.

The recent report(2) from the Ochsner Clinic in New Orleans gives what I believe to be a good representative idea of the relative use of the various types of hysterectomy today. There were 2,284 consecutive hysterectomies in this series, of which 74 per cent were total abdominal operations, 25.4 per cent were vaginal hysterectomies and approximately 0.5 per cent were subtotal hysterectomies. Watts and Kimbrough(3), in an analysis of 1,000 hysterectomies at the Pennsylvania Hospital, reported total abdominal hysterectomies in 69.2 per cent, vaginal hysterectomies in 25 per cent and subtotal operations in 5.8 per cent. The figures from these divergent sources are similar and seem to me to be about what they should be. We should not lose track of the fact that subtotal hysterectomy is indicated on occasion when it is unwise to proceed with a total hysterectomy.

Mortality

Another consideration of interest is the mortality of hysterectomy which has come down to a very low figure indeed. This is not to say that we should regard the risk of hysterectomy as insignificant because the figure is low. Indeed there does remain a hazard of operation which must never be taken lightly. The mortalities for both abdominal and vaginal approaches are low, only two deaths in the Ochsner series of 2,284 cases, 1.2 per cent in the series from the public hospital in Toronto and 0.6 per cent from the private hospital in that city (referred to in Table 2). Watts and Kimbrough had one death in their 1,000 cases or 0.1 per cent. In 1,000 vaginal hysterectomies at Oxford, England, Hawksworth and Roux(4) reported one death and of 1,000 cases of vaginal hysterectomies reported by Benson(5) of Portland, Oregon, there were no deaths.

The principal complications are hemorrhage, infection and injury to the bladder, all of which occur in a small proportion of the cases, whatever the type of operation. Ureteral injuries are being reported with far less frequency in recent years. Acute hemorrhage at the time of operation is encountered occasionally when dealing with large or oddly placed tumors and because of injury to the pelvic veins in radical cancer operations. However, because of appropriate preoperative preparations, this type of hemorrhage

is almost never fatal. More common is delayed hemorrhage from the vaginal cuff or the immediately surrounding paracolpium usually associated with infection. Meticulous control of bleeding points in the cuff and its investment at operation and prompt attention to signs of infection are good prophylactic measures.

Injury to the bladder must ever be kept in mind and special efforts made to avoid hidden injuries. Actually it is better to open the bladder deliberately than to injure it unknowingly and therefore fail to repair it properly.

Subtotal hysterectomy

The subtotal operation has gone out of style because of the incidence of cancer occurring in the leftover stump. The only exceptions are cases in which the total operation would be technically unwise. This seems sound and is widely practiced. To support the validity of this viewpoint the report of Cariker and Dokerty(6) in 1957 is of interest. They reported 334 cases in which a cervical stump gave rise to a complication, as follows:

1. Subsequent vaginal bleeding, mostly cyclic –71.
2. Prolapse–100.
3. Pelvic mass–46.
4. Inflammation–26.
5. Cancer–78 (in 28 it proved fatal).

So-called intrafascial hysterectomy is favored by most for the ordinary abdominal hysterectomy and no doubt it does add to the safety of the operation as far as bladder and ureteral injury are concerned.

Explain everything

Of great importance is the advisability of discussing the implications of hysterectomy with the patient before operation. Many patients have misapprehensions which lead to difficulties later on. Often women associate hysterectomy with deprivation of their femininity or they feel guilty and unhappy over not being able to have children. Or, they are convinced that they will be deprived of sexual responsiveness, etc. These attitudes should be corrected before operation. Kroeger makes the interesting observation that pelvic surgery produces more psychotic reactions than any other type of surgery. It is my contention that it need not do so if the significance of hysterectomy is thoroughly discussed with the patient before operation.

Summary

In summary, we would like to turn again to the advantages of hysterectomy and emphasize that the operation is curative in a great many conditions and has an excellent prophylactic value. It should not be done lightly but, if there is indication, the uterus is not sacred and we should not hesitate. Careful evaluation and preparation are all important. Our conscientious attention to these matters should result in a sound, sensible and quite defensible attitude toward this operation.

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(from New Medical Materia, April 1960)

Editorial

YOUR JOURNAL

Individual opinions are the driving forces which propel our destinies up the turbulent streams of strife toward Utopia.

The advance of society is greatly retarded because only a few of its citizens trouble themselves to share their thinking, conclusions and experiences with their fellow man. The self esteem of each individual is such that it justifies their conclusions, based on their experiences, as being good or even paramount. It is usually the fear of criticism and not humility that blocks their formal expression. This fear is unfounded, because those of wisdom who partake of the experiences of others are fully cognizant of the frailties of himself and others. The unfounded attacks by the ignorant are to be reconciled only by considering the source.

The fact that our own considered opinions are of sufficient magnitude to direct our individual destinies, qualifies them as presentable for others.

"Arizona Medicine" has been owned by the Arizona Medical Association, Inc., and recently The Association elected to also assume the full direction and publication of your medical journal. It is now, YOUR JOURNAL, to use and enjoy as you desire. It is the hope of the Editorial Board that you use this journal to communicate with your fellow practitioners, and thus discharge your obligation to share your experiences and opinions. It is fully realized that these contributions will be as varied as the personalities of the members, and that the subjects may relate to basic or clinical research, case presentations, medical history, professional conduct, social-economic problems, or current

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CONTRIBUTIONS

The Editor sincerely solicits contributions of scientific articles for publication in ARIZONA MEDICINE. All such contributions are greatly appreciated. All will be given equal consideration.

Certain general rules should be followed, however, and the Editor therefore respectfully submits the following suggestions to authors and contributors:

1. Follow the general rules of good English or Spanish, especially with regard to construction, diction, spelling and punctuation.
2. Be guided by the general rules of medical writing as followed by the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION.
3. Be brief, even while being thorough and complete. Avoid unnecessary words.
4. Read and re-read the manuscript several times to correct it, especially for spelling and punctuation.
5. Manuscripts should be typewritten, double spaced, and the original and a carbon copy submitted.
6. Exclusive Publication — Articles are accepted for publication on condition that they are contributed solely to this Journal. Ordinarily contributors will be notified within 60 days if a manuscript is accepted for publication. Every effort will be made to return unused manuscripts.
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events.

The fear that one can not prepare a manuscript need not be a deterrent. The Editorial Board will, in strict confidence, accept your presentations — give constructive criticism — have them edited by professional writers, if you so desire; and before any submitted material is published, it will be returned to each author for final approval. To write is to ventilate; and besides being helpful to others, it can be a great source of personal gratification. Let us hear from many of you. L.B.S.

LETTERS TO THE EDITOR

Darwin W. Neubauer, M.D. April 14, 1960
720 North Country Club Road
Tucson, Arizona

Dear Darwin:

In reference to the article on male impotence in this month's issue of Arizona Medicine; I am rather firmly convinced that the article is inaccurate, and much harm may be done by the administration of Gonadotropin. Sincerely

PAUL L. SINGER, M.D.

Dear Dr. Neubauer: March 24, 1960

This is in reply to your recent communication concerning H.R. 4700.

I haven't had an opportunity to make an intensive study of this legislation, as the House Ways and Means Committee, which has jurisdiction over it, has never processed the bill nor made any report to the House on it. Therefore, I am in no position at this time to take a flat position concerning its merits or demerits.

The best information available here is that action at this session of Congress is unlikely. However, judging by my mail the problem of adequate medical care for our retired citizens is a very real and urgent problem and it would seem to me that the best way to head off legislation such as H.R. 4700 is for the insurance industry to come up with new programs which will meet the needs of these citizens. I hope the insurance people will devote much careful time and creative effort to this challenge in the months ahead. Sincerely,

STEWART L. UDALL

EXAM IN THE BASIC SCIENCES

It is assumed that the examination was originally designed for one or all of three purposes: to keep unprincipled charlatans from claiming to be able to cure or heal; to weed out those practitioners who are practicing only part time in the state, i.e., the "vacationing physician"; and to relieve the competitive pressure in those areas of the state that are over-populated with physicians, i.e., Tucson and Phoenix.

Unfortunately, the examination fails to fulfill any of these ideals. It is designed not as an examination of practical knowledge of medicine, but as a study of the history and basic concepts of allied sciences. A man's ability to treat acute follicular tonsillitis or diagnose and remove a sick appendix are of no value. An unprincipled "quack" could as easily give the Bessemer Process of manufacturing steel as the best of neurosurgeons. Of what value to today's doctor is the knowledge that in 1884 some scientist suggested changing the name protozoa to protista? Thus, it fails in the first laudable premise.

A survey of those currently licensed in this state would show a large percentage of physicians who reside in "foreign" states whose practice here is confined to the winter months when they are on vacation. Thus, this examination is not discouraging this practice.

And, of course, this examination is not stopping the influx of specialists into the only areas of high concentration of population, as the smaller communities cannot attract men of this caliber. And, for this reason, there will continue to be a relative disproportion of physicians and over-crowding of certain areas regardless of any and all types of examination unless this were on a city basis.

What does the examination accomplish? I feel that it is negative. It discourages a number of fine physicians who would otherwise come to our state to practice. It makes it very difficult for small communities to secure the services of physicians at all. Other small communities are putting up with physicians who are alcoholics or drug addicts, or criminal incompetence.

I would like to see the present law requiring this examination changed to conform to the present problems of this state. Possibly complete abandonment would be the answer. I have heard, although I do not know this to be factual, that Arizona students are refused admission to medical schools in North Carolina either in retaliation for this examination, or because as they say that there is no need to train these students when they will not be able to practice in their own state after completing their studies.

QUENTIN L. ERD, M.D.

In Memoriam

ERROL PAYNE PALMER, M.D.

1876-1960

E. PAYNE PALMER, SR., M.D.

The son of George Alfred and Virginia (Payne) Palmer born in Church Hill, Mississippi, October 30, 1876, and died at his home in Phoenix, February 6, 1960. Dr. Palmer practiced medicine and surgery in Arizona well over fifty years and was considered by many of his fellow physicians as the "Dean of Arizona Surgeons." He had served as Chief of the surgical service at St. Joseph's Hospital well over a decade and saw it grow from a twelve bed, "saw horse surgery" to an expansive modern multi-storied general hospital with twelve exquisitely appointed operating suites accommodating 325 hospital patients.

Dr. Palmer stated that his earliest recollection was "when I was four years of age, and I was living at Oak Grove, Church Hill, Mississippi, and at that time I began to ride horseback and a year later attended a country school several miles away. At six I learned to shoot and load a muzzle loading shotgun and we did a lot of hunting in those days." Dr. Palmer's early life was not all devoted to these pleasant pursuits for he stated that when he was eight years of age he began to make his first living picking cotton, he saved some of the money and "purchased a mustang pony that was brought with a drove of horses from Texas, and broke

her for riding and driving. With her I made a cotton crop during my free time from school. I did all of the work in preparing the ground, seeding, cultivating and picking so that all of the profits were mine. As a result of my cotton crop I made enough money to go to Chamberlain-Hunt Academy at Port Gibson, Mississippi." Dr. Palmer has written in his direct, detailed manner, many of his experiences, with the permission of his widow Mrs. Bertha Schantz Palmer, a good portion of this narrative is as he himself related it.

Upon the death of his father it became mandatory for young Palmer to be responsible for his mother and a younger sister; this quickly gave him a sense of responsibility. While he was in grade school during summer vacations he worked on a plantation which belonged to an uncle and during this time he was in charge of the mail, purchasing supplies and paying off helpers. He hired the help and sold goods in the plantation store. He stated that he also learned to drive logging teams of mules and oxen and describes how when a new land was to be cleared that the Negro men of the community came to assist in the removing of logs and brush when the land was to be cleared. "The good logs would be rolled and be pulled into position to be drawn to the sawmill, while the inferior logs would be piled into a big heap with the brush and burned. The Negroes were given a big feed and all the whiskey they cared for. It was dispensed by the barrel, free of charge, but with the heavy work they were performing rarely did anyone ever become intoxicated."

He, his mother and sister, moved to Nanchez in September 1888 and Dr. Palmer's first job "was a printer's devil at $2.00 a week, a promotion to delivery boy from the same firm at $3.00 a week was quite an advantage for a boy." It was here that he later became employed in a retail-wholesale drug and stationery house and "I was moved from one department to another, the main business office, assisting in various ways – and finally was placed in the retail drug store where I began to study pharmacy under the tutorship of Mr. F. A. Dix, the druggist in the store." Young Palmer continued to work and study in this drug store and "took the Mississippi State Board of Pharmacy examination and passed receiving a license to practice pharmacy at the age of seventeen."

It was at this time that Dr. Palmer became interested in the study of medicine and he states that he bought his first Gray's Anatomy in 1894, it is still in his library. During all of this time he was supporting his mother and sister, and as noted, became a registered pharmacist. He moved his family to St. Louis and enrolled in Barnes Medical College. There were a few stumbling blocks to this, he found that he could not register directly in the Medical School because he did not have the "proper certificate of education," so "I took and passed the teacher's examination and received a teacher's certificate for Missouri. This was accepted as satisfactory proof of my qualification to matriculate at the Barnes Medical College. I entered in October 1895, the term was for six months courses over a three year period." In 1896 Palmer took the examination of the Missouri State Board of Pharmacy and secured a license to practice pharmacy in that state and all during the time he was in Medical School he worked as a pharmacist in drug stores in St. Louis.

One of his classmates in Medical School was Dr. R. O. Raymond who came to Arizona a few years after Dr. Palmer and located in Williams and later in Flagstaff. They both practiced in Arizona over fifty years and were friends well nigh on to sixty years before the passing of Dr. Raymond in 1959. Their combined active medical practice careers was well over a hundred years – in Arizona.

After graduation Dr. Palmer became an assistant to Dr. John Young Brown who was later the Professor of Surgery at St. Louis University Medical School. During this time he, Dr. Palmer, opened an office and entered into the practice of general medicine and "soon became busy." He joined the St. Louis Medical Society and was a regular attendant at the meetings.

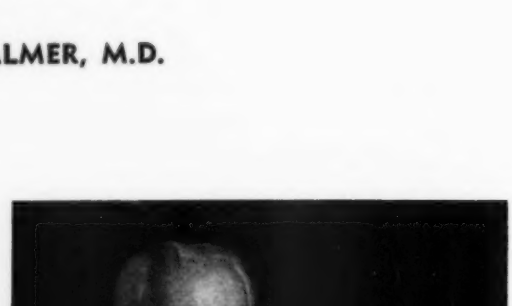
In the winter of 1900 Dr. Palmer had an attack of "influenza" and was advised by his Senior Physician, Dr. Brown, to come to Phoenix to recuperate. This he did and arrived in Phoenix on April 1, 1900.

Since he was a Southerner by origin and disinclined to accept the foreboding winters of the Middle West he located in Phoenix and began his practice of medicine here. Dr. Palmer related many times that "Phoenix was a typical Western

In Memoriam

ERROL PAYNE PALMER, M.D.

1876-1960



E. PAYNE PALMER, SR., M.D.

The son of George Alfred and Virginia (Payne) Palmer born in Church Hill, Mississippi, October 30, 1876, and died at his home in Phoenix, February 6, 1960. Dr. Palmer practiced medicine and surgery in Arizona well over fifty years and was considered by many of his fellow physicians as the "Dean of Arizona Surgeons." He had served as Chief of the surgical service at St. Joseph's Hospital well over a decade and saw it grow from a twelve bed, "saw horse surgery" to an expansive modern multi-storied general hospital with twelve exquisitely appointed operating suites accommodating 325 hospital patients.

Dr. Palmer stated that his earliest recollection was "when I was four years of age, and I was living at Oak Grove, Church Hill, Mississippi, and at that time I began to ride horseback and a year later attended a country school several miles away. At six I learned to shoot and load a muzzle loading shotgun and we did a lot of hunting in those days." Dr. Palmer's early life was not all devoted to these pleasant pursuits for he stated that when he was eight years of age he began to make his first living picking cotton, he saved some of the money and "purchased a mustang pony that was brought with a drove of horses from Texas, and broke

her for riding and driving. With her I made a cotton crop during my free time from school. I did all of the work in preparing the ground, seeding, cultivating and picking so that all of the profits were mine. As a result of my cotton crop I made enough money to go to Chamberlain-Hunt Academy at Port Gibson, Mississippi." Dr. Palmer has written in his direct, detailed manner, many of his experiences, with the permission of his widow Mrs. Bertha Schantz Palmer, a good portion of this narrative is as he himself related it.

Upon the death of his father it became mandatory for young Palmer to be responsible for his mother and a younger sister; this quickly gave him a sense of responsibility. While he was in grade school during summer vacations he worked on a plantation which belonged to an uncle and during this time he was in charge of the mail, purchasing supplies and paying off helpers. He hired the help and sold goods in the plantation store. He stated that he also learned to drive logging teams of mules and oxen and describes how when a new land was to be cleared that the Negro men of the community came to assist in the removing of logs and brush when the land was to be cleared. "The good logs would be rolled and be pulled into position to be drawn to the sawmill, while the inferior logs would be piled into a big heap with the brush and burned. The Negroes were given a big feed and all the whiskey they cared for. It was dispensed by the barrel, free of charge, but with the heavy work they were performing rarely did anyone ever become intoxicated."

He, his mother and sister, moved to Nanchez in September 1888 and Dr. Palmer's first job "was a printer's devil at $2.00 a week, a promotion to delivery boy from the same firm at $3.00 a week was quite an advantage for a boy." It was here that he later became employed in a retail-wholesale drug and stationery house and "I was moved from one department to another, the main business office, assisting in various ways — and finally was placed in the retail drug store where I began to study pharmacy under the tutorship of Mr. F. A. Dix, the druggist in the store." Young Palmer continued to work and study in this drug store and "took the Mississippi State Board of Pharmacy examination and passed receiving a license to practice pharmacy at the age of seventeen."

It was at this time that Dr. Palmer became interested in the study of medicine and he states that he bought his first Gray's Anatomy in 1894, it is still in his library. During all of this time he was supporting his mother and sister, and as noted, became a registered pharmacist. He moved his family to St. Louis and enrolled in Barnes Medical College. There were a few stumbling blocks to this, he found that he could not register directly in the Medical School because he did not have the "proper certificate of education," so "I took and passed the teacher's examination and received a teacher's certificate for Missouri. This was accepted as satisfactory proof of my qualification to matriculate at the Barnes Medical College. I entered in October 1895, the term was for six months courses over a three year period." In 1896 Palmer took the examination of the Missouri State Board of Pharmacy and secured a license to practice pharmacy in that state and all during the time he was in Medical School he worked as a pharmacist in drug stores in St. Louis.

One of his classmates in Medical School was Dr. R. O. Raymond who came to Arizona a few years after Dr. Palmer and located in Williams and later in Flagstaff. They both practiced in Arizona over fifty years and were friends well nigh on to sixty years before the passing of Dr. Raymond in 1959. Their combined active medical practice careers was well over a hundred years — in Arizona.

After graduation Dr. Palmer became an assistant to Dr. John Young Brown who was later the Professor of Surgery at St. Louis University Medical School. During this time he, Dr. Palmer, opened an office and entered into the practice of general medicine and "soon became busy." He joined the St. Louis Medical Society and was a regular attendant at the meetings.

In the winter of 1900 Dr. Palmer had an attack of "influenza" and was advised by his Senior Physician, Dr. Brown, to come to Phoenix to recuperate. This he did and arrived in Phoenix on April 1, 1900.

Since he was a Southerner by origin and disinclined to accept the foreboding winters of the Middle West he located in Phoenix and began his practice of medicine here. Dr. Palmer related many times that "Phoenix was a typical Western

Town of 4,532 population, there were many saloons with women entertainers and wide open gambling of every known kind."

In June 1900 he took the Arizona Board of Medical Examiners test and was awarded license number 102 and opened an office at 108 North "Center Street," now Central Avenue. His reputation was soon established as a skillful, well trained young surgeon and he became successful in his practice.

In the beginning of his practice here in Phoenix, Dr. Palmer liked to relate about making bicycle house calls in town but usually rented a horse and buggy from the livery stable for country calls. Apparently not too long after establishing here he bought a beautiful bay mare which he states "was about six years old, she was part thoroughbred, had been raised in the mountains and trained to drive but was very high strung and easily frightened." Mrs. Palmer remembers well his horse "Gypsy" and she agrees that the horse was "nervous and highstrung." She many times went with doctor to make house calls and states that the horse would seem to stand in the shade and sleep while doctor was in the house but when he got in the cart or buggy the horse was "surely ready to go."

Mrs. Palmer first came to Phoenix in 1907 with her brother who had been advised to come to this area for his health, and met Dr. Palmer, her future husband, through Dr. Palmer's sister, later Mrs. Lane. Mrs. Palmer's maiden name was Bertha Louise Schantz, her father was born in Germany, her mother in Indiana and she herself was a native of Dayton, Ohio and the eleventh of thirteen children. Dr. Palmer carried on a successful courtship of just three weeks before convincing the fair lady from Ohio that she should change her name to Palmer, which she promptly did August 1, 1907. After a delightful wedding trip they returned and made their home in Phoenix.

More about Gypsy. Dr. Warner Watkins used to relate how that when Dr. Palmer went to Europe to study in 1909 he sold this horse to Dr. Watkins who was going to look after Dr. Palmer's practice. Mrs. Watkins gives a vivid description about driving Gypsy one evening down to First Avenue and Adams Street, when the horse ran away, tipped over the buggy and frightened everyone considerably. Fortunately, Mrs. Watkins was not hurt. Well, this seemed to be enough for the Watkins' because Dr. Warner told me that he turned Gypsy "out to pasture" and continued making his calls on a motorcycle. A great many years later when the author heard these various stories we asked Dr. Palmer if it was true that he had sold Warner Watkins a run-a-way horse some fifty years ago. In his careful, mellow, southern drawl Dr. Palmer replied, "Young man that really isn't a good description of the horse, she wasn't a run-a-way horse but when you got in the buggy you had to be ready to go." When Dr. Palmer returned from Europe, Gypsy was brought in from pasture and traded back to him. The financial transactions of this "horse trading" were never clearly understood by anyone but Palmer and Watkins!

When Dr. Palmer came to Phoenix, "St. Joseph's Hospital had twelve beds and no operating room, two carpenter saw horses were placed in the patient's room and boards were put across the two saw horses to make an operating table." "The part to be operated upon was washed with warm water and soap, chloroform was the usual anesthetic and this was usually adminstered by some of the other surgeons."

In 1902 he "successfully removed a large brain tumor from a man who had received a head injury many years before," and during the same year he "performed a cesarean section," he believes that this may have been the "first of its kind or nearly so for each of these procedures in Arizona." Of the many calls which Dr. Palmer made into the surrounding area, Mrs. Palmer recalls an incident about which Dr. Palmer many times subsequently related, something as follows. This probably occurred about 1906 and Dr. Palmer was called to the Maricopa Indian Reservation to see the wife of the superintendent. She apparently was quite ill and it had been requested that Dr. Palmer bring a nurse with him. The Salt River "was at flood stage, and there was no bridge across the Salt River. We left Phoenix driving a double team and when we arrived at the river we were met by two Indians on horseback." Dr. Palmer has written this experience and we will quote it verbatum. "The Indians led the way across the river and as they crossed the river they divided further apart from us so I kept in a midway position in following them, when in the middle of the river one of our horses went down under the water in quick sand. This pulled the other horse down with him, and our buggy turned over dumping us

into the swift current of the mid stream of muddy water. The nurse was washed downstream and went under the water once. When she was up I swam to her and caught her by the hair as she was going down the second time. I brought her to the surface and swam ashore with her all of the time holding her by her long hair. Today with bobbed hair, she probably would have drowned. All of this time the Indian guides were on their way, never looking back to see if we were safe."

In 1906 Dr. Palmer went to Chicago and spent six weeks visiting the clinics of Dr. J. B. Murphy and Dr. Albert J. Ochsner, two of the leading surgical teachers of that era and city. This began Dr. Palmer's regular tour of visiting prominent clinics and surgeons, a habit which he continued all of his life. On this same trip he visited Rochester, Minnesota to see the work of Drs. William and Charles Mayo. He became a fast friend of the Drs. Mayo and both they and their families visited Dr. Palmer and his family in Phoenix on occasion.

After practicing in Phoenix about ten years, Dr. Palmer decided to visit the Old World clinics, they left on July 1, 1909 making some visits on the way but eventually going to New York, Baltimore and Philadelphia where Dr. Palmer did special post-graduate work. His practice in Phoenix was taken over by Dr. Warner W. Watkins, who had recently come to Phoenix. Thereby hangs the tale of the sale of Gypsy the horse "who was ready to go once you got in the buggy," the horse that ran away with Mrs. Watkins, was turned qut to pasture and apparently not driven very much until Dr. Palmer came back to Phoenix some two years later.

In New York Dr. Palmer enrolled as a special student in Cornell Medical College and studied pathology under Dr. James Ewing and attended the surgical clinics and lectures for the Senior students. He also secured an externship in the New York Hospital where he worked with Drs. Hadley and Johnson in the out-patient department and assisted them on all patients who went to surgery. He also worked with Dr. Cooley of the Cooley Toxin fame at the Hospital for the Ruptured and Crippled Children. They spent about one year or so in Europe dividing their time between Vienna, Berlin, Paris and London, all of this time Dr. Palmer spent acquiring more knowledge in the fields of pathology and surgery.

At completion of this period of post-graduate study, Dr. Palmer established himself in Los Angeles, California, but very soon removed back to Phoenix. In later years when asked why he made this move back to Phoenix he said, "There are too many earthquakes in California." It is entirely possible that his many real estate and mining interests which he had already acquired in Phoenix and Arizona had quite as much to do with his return to Phoenix as the "earthquakes."

Now began the long fruitful period of the practice of medicine and surgery. During his professional life which continued well over fifty years, Dr. Palmer was the author and contributed over sixty-five formal papers to the literature. His range of subjects was legion. In the New York Medical Journal, November 17, 1960, he published, "Phoenix Arizona as a Health Resort for Tuberculous Patients". In 1904 he discussed "Normal saline solutions and their physiological uses". Then there follows a whole range of titles relating to cancer, its cause, individual case reports and the treatment of regional cancer. He was a pioneer in the use of lumbar spinal anesthesia and as early as 1910 on one of his visits to Baltimore he demonstrated the use of it to Dr. H. Young.

In 1936 he was invited to address the Second International College of Scientific and Social Campaigns Against Cancer at Brussels, Belgium, in September of that year. This was his first extended trip back to the Continent following his earlier study abroad when he studied in Austria, Germany and England. The Phoenix Gazette which reported something about his trip in the March 21, 1936 issue also stated that "Dr. Palmer is Chairman of the Cancer Control Committee of the Arizona State Medical Association. Other members are Dr. R. N. Looney, Prescott, Dr. R. N. Kennedy of Globe, Dr. Charles S. Kibler, Tucson and Dr. Joseph M. Greer, Phoenix."

He was an active supporter of organized medicine and served as president of the Maricopa County Medical Society, the Southwestern Medical Association, the Arizona State Medical Association, he was a charter member of the American College of Surgery and "Governor of the College for twenty-eight years from the State of Arizona." In 1958 he was awarded the distinguished service award by the American College of Surgeons as he "was honored as the originator of the College's Program of Hospital Standardization, first Fellow of the State of Arizona and

a pioneer surgeon in that State, Governor of the College for twenty-eight years, and a devoted supporter of the ideals and activities for forty-five years".

One of the doctor's most lasting accomplishments, for which he is probably least known in the present generation of medicine, has to do with the establishment of Highway First Aid Stations. In an article titled, "Airway and Highway First Aid Stations", published in Surgery, Gynecology and Obstetrics, volume 62, pages 446 to 448 in 1935, he stated, "Since July 1931, I have laid my plans before many agencies for the establishment of First Aid Stations in the United States. In 1933, I interested the American Red Cross in setting up First Aid Stations on the highways. At that time they endeavored to sponsor the movement. Unfortunately, the general financial stringency at the time prevented them backing the movement to any extent. Today the American Red Cross is willing and anxious to establish First Aid Stations on both the highway and airways of our country. The officials at National Headquarters have just recently approved plans looking to the immediate establishment of stations along our main traveled roads and in emergency landing fields and airports. There are already seventeen First Aid and Life Saving Field Representatives of the Red Cross devoting their entire time to this work and there are 135 First Aid Stations operating now in the United States. Conservative estimates indicate that 1000 stations will be arranged before July 1, 1936."

He recommended that each station might keep on hand a "sufficient quantity of First Aid supplies such as is contained in the Red Cross Kits; a blanket, wooden splints, a Thomas-Murray upper extremity splint, a Keller-Blake lower extremity splint and a stretcher. There should also be two or more trained persons at administering First Aid of the injured and a method of transportation available at all times at each station." He commented, "the approximate cost of equipping a station is about thirty dollars," now thirty years hence about all we can get for that amount of money is a roll of bandage and a box of band-aids, no stretcher, no splints, no blanket. This paper he presented at a symposium on fractures before the Clinical Congress of the American College of Surgeons meeting in San Francisco in October 1935. As a point of interest, Mrs. Palmer states that many times on their Sunday afternoon rides through the country one of the children would point to one of these Aid Stations and exclaim, "there is one of Daddy's stations." Now from this early work and foresight of this pioneer Arizona physician our entire country is dotted with Red Cross Aid Stations, an idea first germinated in the fabulous Valley of the Sun.

In discussing "The Recent Advances in Surgery", in 1941, he was quick to perceive and recognize the value of the antibiotics but he was loath to discard some tried and true remedies. He stated, "some of the old remedies seem to have quickly been forgoten by younger physicians, zinc peroxide has proved effectual in the control of fetor, infection and pain in necrosing canceral lesions. Drainage is markedly lessened."

In the early 1920's, Dr. Palmer organized the Southwest Clinic and during the next decade he was associated in this practice of medicine with several physicians. Dr. Frank Milloy, gastroenterology — the first specially trained specialist in this field in Arizona; Dr. Charles Vivian, urology; Dr. Spencer Whiting, chest diseases; Dr. Elton R. Charvoz, obstetrics; Dr. Adams, gynecology; Dr. Dudley Fournier, obstetrics; Dr. Charles N. Ploussard, surgery.

He is remembered by one of these physicians as, "he was always very kind and helpful to the young physicians and resented very much the fact that other older physicians did not give the younger men a helping hand." Dr. Palmer was a stickler for precise, careful, surgical technique, he was also a stickler for promptness. Anyone who didn't appear promptly at the clinic for ten o'clock office hours was sure to hear of his tardiness before the day was over.

Another physician, who interned at St. Joseph's Hospital, remembers the prodigious work load which Dr. Palmer carried. He frequently did five to eight major surgical procedures a day. This interne made it his business to assist Dr. Palmer as frequently as possible — for Dr. Palmer was a meticulous, careful surgeon, and always striving to perfect his own technique and teach the younger men. Dr. Palmer took great pride in the fact that St. Joseph's Hospital was first in the State with an approved internship and a School of Nursing.

Mrs. Palmer relates that while her husband attended many post-graduate meetings and trav-

eled extensively visiting clinics, while he was in Phoenix on the job, his work was continuous seven days a week. He usually tried to have Sunday afternoons free to spend with his family but other than this he was devoted to his practice. He related how his early years in Phoenix he slept in his office many times with his clothes on because his was the only way in which he could attend to all of his night calls and busy practice. Lo, how the years have changed the philosophy of young medical men, hence why we need a Directory to search for a physician to do night calls.

The professional life was complimented by his church and community work. He was a member of the Knights of Columbus and a prime mover in the development of St. Joseph's Hospital, both its physical plant and surgical standards.

In 1942 he was elected President of the Arizona State Medical Association and delivered his annual address in Prescott May 25, 1942. His topic was "Arizona Medicine in 1900 and Today" and this gives a good deal of his philosophy and not a little of the history of early Arizona medical times, the reader should consult it directly for its full impact. He stated, "we owe a deep debt of gratitude to the pioneer physicians of Arizona. They made possible the medical profession as we have it today. Prior to 1900, even in the best medical schools, training was insufficient; students memorized lectures from notes; there was little clinical instruction, no experimental training; even equipment was meager. Here in Arizona, physicians lacked hospital facilities and many pioneer physicians were located in remote places, they were unable to obtain assistance or consultants when needed. Those were the horse and buggy days, days with only paths, or at best poor roads to travel. In town many of the physicians made use of a bicycle for short distances and night calls, finding it less troublesome than hitching up his horse."

"The Arizona Pioneer Physician was a person of indomitable courage, striving to do his duty to his patients and to uplift the Medical Profession. This was the type I found upon my arrival April 1, 1900. They were friendly, but they were strong competitors. I was told that medical ethics prevailed in Arizona and must be observed."

"Forty-two years of practice, (1942), first in the Territory, and then within the State of Arizona, have taught me this if nothing more; life becomes worthwhile doing, not getting."

E. Payne Palmer, he saw: the tallow tip electrify to television; the saw horses traded for mechanical marvels in the surgical ampitheater; his cow town become a metropolis; some of his ranches acquire ribbons of concrete for screaming jets; his "aid stations" perch on the aprons of freeways and highways across the nation; and his program for hospital standardization adopted by the American College of Surgeons — now under different sponsorship — virtually the law of Hospital Land!

Yes to Doctor Palmer, this pioneer physician of Arizona, we owe a deep debt of gratitude!

JOHN W. KENNEDY, M.D.

NATIONAL RESEARCH & INFORMATION CENTER

The National Probation & Parole Association has long known the need for a nation-wide center to:

act as a clearing house for the massive body of information available

expand the reserves of fundamental knowledge

pinpoint projects so as to avoid duplication of effort

apply research to the economical functioning of correctional treatment

disseminate acquired information to the advancement of all fields concerned with crime and delinquency.

In wholehearted accord with this goal, the Rockefeller Fund, in December 1959, gave a grant of $41,900 to NPPA to set up this first national research and information center.

Arizona Medical Association Reports

PRESIDENTIAL ADDRESS

Lindsay E. Beaton, M.D.

The following address, presented by Lindsay E. Beaton, M.D., President, on ascending to that office, is published herein verbatim for the benefit of the membership who were unable to attend the recently completed 69th Annual Meeting of The Arizona Medical Association.

Dr. Melick, Members of the Association, Honored Guests, no physician can be chosen President of his State Medical Association without feeling both gratified and unworthy. For one who practices my branch of our common science, the senses of honor and humility are compounded. It was not long ago that Sinclair Lewis in *Arrowsmith* called psychiatry "a plot against medicine." Yet here today a psychiatrist succeeds a surgeon as the nominal head of a major segment of American medicine, a sign that the specialty has won its place and that its advocates are respectable. I take my elevation to this esteemed and responsible office, therefore, not as a personal encomium, but rather as recognition of psychological medicine and of the men and women who serve it in Arizona. Nonetheless, my gratitude to my fellow physicians is unbounded for this signal, albeit undeserved distinction, and for this opportunity to be for a year, the spokesman, however untalented, of our Association.

As I have reread the presidential addresses of my predecessors, I have been struck with a unity of text, the pledge of medicine to care for the ill. This thesis is equally mine today. As each incoming President has applied his own particular discernment to writing a set of variations on this theme in discussing the needs and aspirations of our Association, you will perhaps excuse my turning in part to the insights of psychiatry and social psychology. If I become oracular, remember gratefully that the power of Delphic utterance descends on each President for this half hour only and never returns again.

I petition your attention this morning to the topic of the public image of the doctor, its delineation, past and present, the reasons for its evident alteration, and the truer portrait that may be substituted for it. No demonstration is needed to prove that the physician has found himself in a chillier climate of national opinion in recent years. Traditionally he was not only respected for his professional skills but beloved for his personal relationships with those for whom he cared. He was the accepted symbol of selfless devotion to duty. Today, he has undergone what often seems to him like systematic and studied deprecation. Beneath the rapturous platitudes about medicine with which we regularly beguile ourselves, let us note a hard fact: many people now think of us as men concerned first with personal gain and only secondly with the welfare of the sick. You will remember in a New York paper the cartoon of the doctor, with every part of his anatomy and paraphernalia

labeled in acid commentary on his economic self-interest and callous indifference. In a recent issue of the Saturday Evening Post, that fine old organ of the left wing, an editorial equated alleged abuses in modern surgical practice with the immoralities that have lately marred the country's commercial life. There is no necessity to multiply the evidence. Every one of us is aware, from the jocular but biting references of friends and patients to our charges and our millions, of unflattering cynicism about our professional principles. Not only are we regarded in certain circles as venal, but to complete an ugly picture, attendant mercantile traits are ascribed to us. We are seen as snug, aloof from human suffering, too busy profiteering on illness to drive our Cadillacs out on house calls. We are accused of having formed a tight guild that blocks the development of new medical schools, deters the recruitment of young physicians, favors sterile specialism, and contests every social advance that mgiht offer better care to medically indigent groups, all in restrictive protection of our own vested financial interests.

To the physician this is more than a savage lampoon; in purple indignation he calls it a total falsehood, presumably perpetrated by Communists. Wrong as we find the description, we had best abandon ourselves neither to apoplexy nor paranoia but rather try to understand how it can possibly be seriously presented, and not alone by crackpots but by sincere critics. The rank and file vote their convictions in terms of images presented to them, not in terms of facts, which may be largely inaccessible to them. We probably have little to fear from accurate impressions of doctors, but if organized medicine does not do something to erase the prevalent caricature, it may deflect the destiny of the profession.

There must be many reasons for the currency of this grotesque public image of the physician. Some may be suggested without any pretensions of completeness and without the order of discussion necessarily being the order of significance. High among them is probably the change in the nature of medical practice from an intensely personal service to the objective and highly intellectualized approach demanded by the sophistication of modern biological theory. With all the enlightenment of modern psychiatry and the stress laid in every branch of medicine on correct psychological understanding, the links between doctor and patient are nonetheless bound to be less surely intimate. Nor can we expect the old unqualified admiration from the layman. He reads the Reader's Digest too, and he knows about research. He no longer necessairly feels that his health has been salvaged or his life saved by the physician's personal effort alone. Very often the practitioner is seen merely as a purveyor of scientific medical knowledge rather than, as in the past, its sole possessor.

Perhaps of equal importance, in the welfare state, is the growing popular expectation of medical care as an actual political due. Not only will a demand for insured access to health services be the next expansion of the drive for total security, but, preposterous as it may seem, the next freedom to be ordered in a Western democracy will perhaps be freedom from disease. The economist, John Galbraith, puts it flatly: "As health and physical hazard decline, men come to think of them as abnormal rather than normal afflictions." When any social desire is viewed as a right, some citizens are quite naturally very soon going to demur at paying individually for that right.

The concept of freedom from disease is itself a dangerous social illusion. The physician becomes practically aware of the threat when he sees himself continually menaced by malpractice litigation, the presumption for which is that failure to recover from illness must be the doctor's fault. This partly derives from our own propaganda about the "miracles" of modern medicine and the consequent anticipation of the populace. The legal doctrine of warranty, of guarantee of the product offered in the marketplace, has been applied to the manufacture of medications and may also be creeping into the practice of medicine. We suffer in the public eye for not being able to deliver the impossible.

Another reason, more speculative but perhaps more basic, for the change in regard for the physician may be that his conventional image, drawn from the past, has become an anomaly in the 20th Century. In Victorian America, the doctor was in a way the epitome of the virtues admired in his age. He was an undisguised individual in an epoch that respected individuals. Now he finds himself in an increasingly collectivistic society that substantially denies the values of inner moral direction and personal effort. In many ways, he no longer shares the common experience of many of his patients. His very

learning has become complex and esoteric, more difficult to expound to the medically uneducated. This helps to explain the persistence of folk cures and the success of charlatans. Honey and vinegar are easier to understand than steroids. As a member of society, less than almost any other does the physician fit the pattern of the compliant organization man. He partakes little of the present-day conviction that a decision is better reached by a team of mediocrities than by a single able individual, that purpose must be a compromise of all points of view. It is true that one sees clinics, panels, "staffings", and other reflections in medicine of the "groupism" of the times, but eventually the patient must have his health problems appraised by his doctor and his medical affairs managed by that doctor. Also the physician remains hard-working, in a culture centered on leisure. As David Riesman and others have predicated, in an affluent society as work becomes less meaningful, less intense, and less essential, the role of leisure grows, and the individual becomes crucial not as a producer but as a consumer. But the physician's work remains full of meaning and gratification. He probably works longer and harder hours than anyone else in the community, and he is suspect as being different.

Finally, perhaps in the changing view of the doctor held by a mounting proportion of the public, there is some truth, reluctant as the admission would be in the mouths of most of us. The image is certainly false for the individual physician, but can we recognize it as a distortion mirroring the preoccupations of organized medicine? Perhaps our leadership has led us to a position of old guard inflexibility and has not been responsible enough in developing new adjustments of practice to social realities. Perhaps, as a fraternity, we have not been willing to acknowledge the place of the allied health vocations in the treatment of the sick, to concede the obvious fact that in an enormous and complicated democracy, the total care of the ailing cannot be the unassisted prerogative of the doctor. Perhaps, alienated from the commonalty by our altered relation, instead of becoming a professional elite, drawn from and cutting across every social stratum, at the service alike of beggar and banker, we have drifted into an upper class status identification that prevents us from recognizing the wishes and needs of the great mass of our patients. Perhaps, we have put unnecessary energy into securing economic advantage for ourselves.

So much for the distasteful set of premises. As we seek peace with the public, first of all we must fortify the grounds from which no retreat is possible, the bulwarks that protect medicine as a profession. A profession is a way of life that is based on a body of knowledge, transmitted by systematized instruction to its postulants, rigorously governed by its own standards, enduring through the individuals who comprise it, and entered for its inherent values and not first for individual profit. As medicine becomes subject to controls and modifications, as it inevitably will, these essences can never be sacrificed. Never can the doctors of America abandon to other dictates the content of the medical curriculum. They will retain this authority and delegate it only to their colleagues who specialize in education. Secondly, whatever social and economic solutions are finally affirmed for the problems of the care of the sick, they must be such as not to impair the physician's discretionary superintendence of his patient. The only appeal of a medical decision is to the doctor's peers, and the standards to which he is held are those of the profession itself. The freedom to set those standards and to judge adherence to them is the heart of medicine. Finally, it is socially disastrous to promote measures that impede the flow of candidates into medicine. The profession can never countenance its degradation into a hired trade, can never yield its moral and intellectual independence. This course would be the sure destruction of those incentives that draw able men into a demanding discipline, of the motivations that knit them into a dedicated company against disease.

As we turn to scrutiny of the task of repairing the image of the doctor, there are certain measures most firmly to be avoided. I take it as obvious, first of all, that we will not, with pious tongue in fat cheek, cry nostalgically for the old and pretend that we are still 19th Century leeches and should be adulated as such. In Lincoln's phrase, one cannot escape history, and this applies tellingly to medicine. We cannot restore the day of the country practitioner, beloved counsellor to the whole rural family, symbolized in the Fildes picture of the doctor sitting by the bed of the sick child. The era of helplessly holding the patient's hand has passed. Not that the tradition of prolonged attendance in the crucial

hours of illness has lapsed. The night watch remains in the exchange transfusion, the post-operative vigil after cardiac surgery, the use of the artificial kidney, the adjustment of a brittle diabetic, the quieting of an acutely disturbed depressive. However, for the youngster with pneumonia, antibiotics have replaced the doctor's sleepless hours. An injection of four hundred thousand units of penicillin in the right buttock not only stings, but understandably does not engender the same sense of gratitude. Yet we must practice our profession as it exists, making use of the skills of today. The very compassion and tolerance professed by psychiatry and consequential in every doctor's practice are a far cry from the managerial paternalism of an earlier and simpler age of medicine. The arts of psychological healing have grown too.

The second negative caution is against faith in publicity salvation through the ministrations of the mahatmas of Madison Avenue. The craft of public relations may not be outright deception, but it certainly is always guilty of the strategic ruse of omission, in the selection of facts favorable to the cause. This is at best a not very innocent game; it has no place in the serious concerns of health and illness. Since the time of Whitaker and Baxter, the American Medical Association has found itself bewitched by the dubious sorcery of press agentry. A knowing mass audience is likely to think that our advertising is as close to reality as the claims made for deodorants, depilatories, and dentifrices. As Chauncey D. Leake has so cogently written, in a letter to the Journal of the American Medical Association, "It would help if we could get away a bit from our devotion to the psychology of persuasion, to the more farsighted viewpoint associated with the psycology of responsibility."

Thirdly, I would have us eradicate from our official program the strident demand for the economic rights of doctors. Nothing labels us more pointedly in the public mind as being interested primarily or exclusively in personal gain. The people have read too long our defensive special pleadings about a favored income level; they have become derisively aware that the most widely read medical magazine in the United States is said to be "Medical Economics". They cannot be blamed for the suspicion, however mistaken, that in their reactions to medico-political isues physicians are upholding their industrial standing and not the necessary liberty of a profession to guard its purely professional functions.

Long ago the great Virchow thundered that medical instruction does not exist to provide individuals with an opportunity of learning how to make a living, but in order to make possible the protection of the health of the public. Paradoxically, once we stress this social covenant of medicine and put aside obsession with finances, we will be more likely to achieve personal security. There is nice irony in the obvious fact that the corporation executive who scoffs at the physician as a poor business man would be happy to trade incomes with him. It has been a sign of public affection that we are considered not shrewd in the ways of trade; we will be better off if we can regain this reputation of being concerned with patients, not pelf. Plainly the doctor does well in providing for himself and his family, but probably less due to his own acumen about money than to the gratitude of his patients. It is true that a majority of people value medical care more if they pay for it, a psychological hypothesis that has been an item of faith with psychiatrists and a great comfort to them, but fundamentally it is appreciation for an indispensable personal service that will always guarantee the physician an honored place in American society and, if we must, a financially secure one.

As a final prohibition, adjunct to the admonition to be less haunted by economic self-solicitude, organized medicine should be bidden to stop the kind of political activity that has resulted in the common belief that doctors are the spearhead of the far right wing. As citizens, as political units, each of us has license and obligation to speak his piece in the great debates of a frighteningly critical moment in history. Medicine as a social entity, however, attends only the non-partisan interests of health and must not become associated with any political party or social theory. There is potential disaster for the profession in identification with the ultra-conservatives. It is inevitable that health will be more and more a field of political promise. It is too tempting for the politician to offer the plum of someone else's toil, and both of the major parties, at this writing, are clearing their throats about governmenal sponsorship of health care for the aged. This represents political reality. Let us not risk our mission by allegiance to any economic philosophy. Our identification is with

the sick. We should want it unmistakably understood that we serve the health purposes of the public, not the political purposes of the National Association of Manufacturers, any more than we would wish to support the similar purposes of the AFL-CIO. It is not a simple matter, of course, to separate a position about health from its social and economic parameters, for patently legislative proposals in many areas gravely bear on questions of disease. We can at least discount our own socio-economic prejudices, most of us being by background and status convinced conservatives, and try to make our concerted medical stands rest on the single touchstone of their benefits to the ill. The people at present largely believe that we do our lobbying and Washington infighting for personal economic and political motives, that we have fought the Forand Bill not because we think it would lead to poor medicine, but because we think it would squeeze our pocketbooks. The doctor's pocketbook is of little concern to the man in the voting booth. His health is.

This is not to stay that we do not have the right to speak out in self-interest in matters that concern us as a professional group where the welfare of patients is not involved, as for example on the inclusion of physicians under the Social Security Act. And most emphatically we do not abandon the battle against the real threats to medicine, but we must fight on proper grounds, for the right cause. There are plenty of valid scientific objections to certain proposals for changes in the character of health care. It is arguments of this sort that one would like to see proposed, not arguments about economic and social disputes in which our competence is minimal. The rational exception to bureaucratic power over medicine — by government, labor, or business — is for intellectual and professional reasons, not economic ones. Such control would put the care of the ill into the hands of managers and administrators who are indifferent and actually hostile to science. Not only might their immediate decisions about medical care be intolerable but, equally importantly, advances in medical science might be blocked. Bureaucratic obstructionism of this sort is on record, in the published testimony of men, such as Admiral Hyman Rickover, involved in branches of our defense establishment. On this basis we are skeptical that federal or state control could do other than impair medical care. It is unhappily easily proved that the government executive (or the business and labor executive) presumes to dictate on technical matters to the professional. Medicine cannot maintain its integrity or do its job if such circumstances pertain on a wide scale. It can and should be asserted that an organizational hierarchy is the natural foe of innovation, while discovery is the very pulse of medical science. Bureaucracy has shown itself intolerant of individual initiative, and the physician's integral responsibility is the heartblood of medicine. We also have the right to question whether it is possible to have state financing without state dictation, or business or labor financing without business or labor dictation. In a merchant culture it is accepted that he who pays the piper calls the tune. Finally, we can and should make the point that one goes slowly in destroying a professional edifice, whatever its flaws, that has provided the rooms in which such outstanding work has been done. To paraphrase Winston Churchill on the subject of democracy, private practice is obviously the worst possible way to take care of the sick until you look at the alternatives.

Even if we can bring about attitudinal changes in organized medicine, so that we are relieved of the miserable necessity of going steady with our own false image, there is yet more to be done. To coin a sparkling phrase, we need a positive approach, if the people are to have a chance to know us as we truly are. First, we need a set of explicit programs. Most accurately the problem is one of giving concrete formulation to convictions we have long held. Here it seems to me there is real hope and real progress. A fresh breeze is blowing through the halls of 535 North Dearborn Street. The American Medical Association, in addition to the unsung work of its scientific departments, is giving exact shape to the conceptions of America's doctors for medical management of the aged and rehabilitation of the handicapped. These programs will be at first received with some doubt in certain circles. All the more reason for us strictly to weed out of such projects any intimation of monetary self-interest or political aim. Just the sort of proposal I mean is the one on careers in medicine started by this Association last year under the imaginative guidance of Dr. Melick.

As a second affirmative action, one that might especially serve to erase those strokes in the false image that paint the doctor as class-con-

scious, aloof from the majority, and remote from the social questions of the day, it would be advisable if all physicians were to be prompted to engage in community activities. With charitable enterprise coming increasingly under the dominion of social agencies, with public or semi-public rather than private financing, the physician's direction is evermore urgently required. It is not only that a share in the supervision of philanthropy is an opportunity to influence such agencies in the adoption of proper policies that may affect medicine. From the point of view of the consideration of his public image, it will bring the doctor into initmate contact with all kinds of persons and problems and allow his sympathetic concern to serve an antidote for the slur of selfishness.

Thirdly, in his guardianship of health, the physician must realize that no longer is he the sole warden of the keep. The complexity of health problems has given rise to the many paramedical callings, from the university physiologist to the hospital aide. Here we have a dual and delicate task. First of all, we must accept authority over the *entire* health field. If we do not, someone else will, probably the government and we will find medicine only one of several disciplines in a public health empire. Secondly, we should receive workers in the paramedical areas as welcome recruits and fit them into the team. This is no subtraction from the scope of our practice. Rather is it an opportunity for extension of our stewardship. As the ultimately accountable individual, the doctor only insists that final medical decision be made by him, no matter what contribution other disciplines have made in providing information toward that decision. He should now let the public know once and for all that he has no desire to preempt and hoard all services to the ill for his own gain. Here in Arizona, with a rather small and happily close fellowship of physicians, the federated unity of the health professions could appropriately be the business of your Association in the oncoming year.

In the very last reckoning, it is what lies in the heart of the physician that will determine his authentic image in the public eye, if he will but show it openly. The means I have suggested will ring true only if they proclaim what doctors believe. It remains then to make sure that organized medicine becomes the voice of those beliefs. Through our own vigorous participation we must see that it expresses *our* desires and *our* ideals.

We have perhaps become distrustful of our own idealism; we live in an age of little faith. Yet, historically idealism is an inseparable ingredient of medicine. We derive from the priesthood, and people still expect us to act with a certain religious consecration. In this light the very criticism to which we are subjected is compliment, for it implies a sense of an ideal betrayed. Not entirely extravagantly the physician's personal experience can be likened to that of the Buddha, whose whole life was changed when he escaped the seclusion of his father's palace and rode through the countryside where he saw the corpse, the cripple, and the aged beggar. No doctor is the same after he has lived a while with death, illness, and the ravages of age and poverty. In the immediate human sense, as well as in the historical sense, medicine cannot escape its moral base for it rests on the only biologically unassailable purpose, the preservation of the members of the species. It is this origin that, psychologically, makes caring for the sick person an act of love. If it is not rendered in that emotion, it is not good treatment, for it then fails to tap what Gregory Zilboorg called the physician's "therapeutic intent", the need to cure. In return the physician is most repaid by his unequaled office, privileged beyond all men by his coveted and essential presence at the great crises of every life. More than any other man, he stands for the love we bear one another, and the responsibility we have for our brothers.

For the sake of our public image, but even more for the good of our souls, each of us needs periodically, to recognize unreservedly the idealism implicit in the physician's way of life, to rededicate himself to the purposes of medical practice and to divest himself of that which is irrelevant. If the doctor remains staunch in his trust, he need never fear for his rank in any form that society may take, and, more nobly, he will have discharged the duty to which he was called. In 1960 it is timely for the physician to renew in his personal credo that stern promise of the Hippocratic Oath, from which this address took its title. "Into whatever houses I enter," reads the Oath, "I will go into them for the benefit alone of the sick. In purity and in holiness I will pass my life and practice my Art."

1959-60 ANNUAL REPORT OF LEGISLATIVE COMMITTEE

During the current fiscal year to date it has been necessary to schedule but one meeting, which was held in Scottsdale, Arizona, January 10, 1960. This, of course, does not represent the total effort expended by your committee thus far during the second regular session of the 24th Legislature of the State of Arizona. Most of you, I am sure, realize the many hours that are devoted to conferences with individuals, groups and committees of both bodies of the Legislature in consultation requiring forbearance and fortitude in our endeavor to achieve the objectives sought. Tihs year has been no exception.

Your Legislative Committee considered the following matters and submitted its recommendations to the Board of Directors of this Association for its further deliberation and direction:

1. Recommended enactment of an amendment to Section 36-135, A.R.S. relating to public health, prescribing the salary of the Commissioner, establishing a range from $12,500.00 to $17,500.00, and setting forth qualifications for the position.

2. Recommended approval of an appropriation to the State Department of Health in the sum of $25,958.00, to complete the purchase and installation of necessary equipment and cabinet work, etc. to refurbish quarters in Tucson to accommodate the southern Arizona branch of the State laboratory.

3. Recommended amendment to Section 36-132 B, A.R.S., granting authority to the State Department of Health to enter into contracts with other governmental departments, agencies, private organizations, etc. for the purpose of providing additional professional or public health services to the State.

4. Recommended amendment to Section 36-105, A.R.S., to provide for the more expeditious handling by the State Department of Health of procedures dealing with abatement of public nuisances.

5. Recommended adoption of a memorial for presentation to the Arizona Corporation Commission urging consideration of the establishment of an increase in ambulance services fees on a comparative basis with other States; this problem to be taken to the Maricopa County Medical Society's Legislative Committee for further action; and that steps be taken to introduce a measure in the State Legislature similar to Section 21714 of the California Vehicle Code, referable to operation of ambulances in emergency service, requiring first aid certification of operator or attendant on duty therein.

6. Recommended to the Board reiteration of its previous stand opposing the use of fluoroscopic shoe fitting equipment in commercial stores

7. Referred for further study by counsel H.B. 62 introduced by Representative Nelson D. Brayton, M.D., this state legislative session, providing for the establishment of a Cancer Advisory Committee, pending further action by this Committee.

8. Reviewed the problem confronting doctors of Coconino County relating to treatment of civilian Civil Service employees and their dependents by military medical personnel at the Navajo Ordnance Depot hospital in Bellemont, Arizona, presently being investigated by another committee of the Association.

In the Congress of the United States H.R. 4700, known as the Forand Bill, is, without question, the most important piece of legislation currently being considered by the House Ways and Means Committee. If enacted into law, the Federal Government will control and administer medicine establishing a system of socialized medicine for a large segment of the population. It would initially provide a limited amount of hospital, surgical, and nursing home treatment for some 16 million people eligible for Social Security retirement and survivorship payments. Americans rejected socialized medicine overwhelmingly in 1950. Here it is again — this time under a different label. Political medicine is bad medicine and we must rally all forces at our command to again defeat such encroachment upon the high quality of medical care being administered the people today. From the national through the state to the "grass roots" county level, all-out effort is being exerted to again realize the defeat of this legislative effort. The officers and committee members of your Association are doing their part. The active support of this objective by every doctor of medicine is requisite to its accomplishment.

It has been my privilege and pleasure to again serve the membership of this Association in the capacity of chairman of its Legislative Committee. It has been a challenging and rewarding experience. To the members of this Committee, to the Board of Directors who have co-operated so

fully, and to all my conferees who have responded so willingly, assuming their share of responsibility toward promotion of sound legislation for the good of all peoples, my sincere and warm thanks.

ADDENDUM

With adjournment of the 24th Legislature of the State of Arizona, Second Regular Session, the Legislative Committee is now in position to further report the results of activity throughout the state legislative session just concluded.

It is to be pointed out that the following two measures considered MUST legislation which this Committee was directed to actively support, again we were successful in having them enacted into law following signature of the Governor, they having passed both the House and Senate:

H.B. 104 — An Act relating to Public Health; providing for an increase in the compensation of the Superintendent of the State Hospital ($12,500 - $15,000).

H.B. 153 — An Act relating to Public Health; prescribing the salary of the Commissioner of Public Health ($12,500 - $15,000 amended to $16,500).

Listed below are those measures in which the Association had an interest, followed daily and were likewise enacted into law:

S.B. 49 — An Act relating to Non-Profit Corporations; providing for the formation and number of Directors thereof — exempting specified number (3 - 25) applicable to non-profit corporations organized under the provisions of this Article (Sec. 10-451) for charitable, religious, educational or scientific purposes. (Emergency clause).

S.B. 99 — An Act making a supplemental appropriation to the State Department of Health for the State Tuberculosis Sanatorium ($10,000) supplementing the personal services and other current expenditures line items in the budget to June 30, 1960 (Emergency) Amended to $5,000.

S.B. 109 — An Act making an Appropriation for Planning and Construction of a Tuberculosis Sanatorium ($50,000).

S.B. 166 — An Act making an Appropriation to the State Department of Health ($25,958) to complete purchase and installation of necessary equipment, etc., for Southern Arizona Branch of the State Laboratory.

H.B. 145 — An Act relating to Public Health; defining tuberculosis person; providing for assistance for care or treatment of tuberculosis.

H.B. 226 — An Act relating to Narcotics; defining narcotic drugs to include new drugs of a natural or synthetic nature; prescribing those preparations exempted.

The following bills in which the Association did not specifically give direction were studied and followed daily by your Committee; however, they "died" in either the Senate or House; consequently, they were not enacted into law:

S.B. 81 — An Act relating to Taxation; exempting food products, medicine and water from the Transaction Privilege Taxes.

S.B. 210 — An Act relating to Dispensing Opticians; prescribing qualifications of applicants; prescribing unlawful acts.

S.B. 217 — An Act relating to Chiropody; providing for reciprocal licenses.

H.B. 4 — An Act relating to Public Health; prescribing powers and duties of the State Department of Health relating to Radiation protection.

H.B. 32 — An Act relating to Taxation; prescribing exemptions to the Education Excise Tax (including Drugs).

H.B. 40 — An Act relating to Occupational Diseases and Disability.

H.B. 41 — An Act relating to Public Health and Safety; creating a state committee for the purpose of correlating results of county control boards organized to study problems of Air Pollution.

H.B. 42 — An Act relating to Public Health and Safety; prescribing the method of reporting a contagious disease (V.D.)

H.B. 62 — An Act relating to Public Health; providing for the establishment of a Cancer Advisory Committee.

H.B. 86 — An Act relating to Taxation; exempting food products, medicine and water from Transaction Privilege Taxes.

H.B. 144 — An Act making an Appropriation to the State Department of Health for the establishment of a state-wide preventive mental health program ($6,000).

H.B. 159 — An Act relating to Taxation; providing for exemption of medicines from provisions of Transaction Privilege Taxes.

H.B. 174 — An Act relating to Premarital Examinations and Marriage Licenses; authorizing acceptance of Blood Bank or Red Cross certificate in lieu of Certificate and Laboratory Statement prescribed by law.

H.B. 187 — An Act relating to Crimes; pre-

scribing punishment for advertising to produce abortion; removing punishment for advertising to prevent conception.

H.B. 209 – An Act relating to Mental Health; providing that definition of "Mental Illness or Mentally Ill" shall include addiction to alcohol.

H.B. 234 – An Act relating to Professions and Occupations; establishing a State Department of Occupational Licensing, etc.

H.B. 242 – An Act relating to the State Prison; providing for a full-time doctor of medicine; a full-time psychiatrist and a full-time director of education and vocational rehabilitation, etc.; providing for an appropriation.

H.B. 257 – An Act relating to Dispensing Opticians; prescribing qualifications of applicants; prescribing unlawful acts.

H.B. 265 – An Act relating to Motor Vehicles; providing qualifications for certain ambulance drivers and attendants, etc.

H.B. 273 – An Act relating to Taxation; exempting food products, medicine and water from the Transaction Privilege Taxes.

H.B. 285 – An Act relating to Public Health and Safety; providing for the declaration of public nuisances dangerous to public health; prescribing procedure for obtaining compliance with cease and desist order.

H.M. 6 – A Memorial requesting the Congress of the United States to extend the application and benefits of Old Age and Survivors Insurance and Unemployment Compensation to all citizens.

There were a number of other bills of interest, dealing with various health and welfare agencies, which were observed and followed throughout the session.

All in all, your Legislative Committee concluded another busy legislative session achieving the specific goals sought and directed by the Board of Directors. To those of our members called upon to render advice and assistance who so willingly and freely gave of themselves in this necessary teamwork endeavor, we express our most grateful appreciation and thanks.

Respectfully submitted,

Reed D. Shupe, M.D.
Chairman – Legislative Committee

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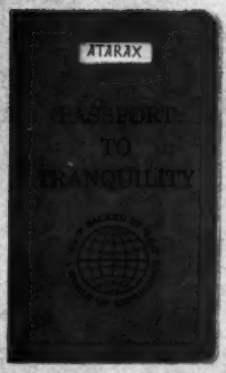

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IN ELDERLY PATIENTS well tolerated by debilitated patients	"... seems to be the agent of choice in patients suffering from removal disorientation, confusion, conversion hysteria and other psychoneurotic conditions occurring in old age." Smigel, J. O., et al.: J. Am. Geriatrics Soc. 7:61 (Jan.) 1959.	Settel, E.: Am. Pract. & Digest Treat. 8:1584 (Oct.) 1957. Negri, F.: Minerva med. 48:607 (Feb. 21) 1957. Shalowitz, M.: Geriatrics 11:312 (July) 1956.
IN ALLERGIC PATIENTS useful adjunctive therapy for asthma and dermatosis; particularly effective in urticaria	"All [asthmatic] patients reported greater calmness and were able to rest and sleep better ... and led a more normal life.... In chronic and acute urticaria, however, hydroxyzine was effective as the sole medicament." Santos, I. M., and Unger, L.: Presented at 14th Annual Congress, American College of Allergists, Atlantic City, New Jersey, April 23-25, 1958.	Eisenberg, B. C.: J.A.M.A. 169:14 (Jan. 3) 1959. Coirault, R., et al.: Presse méd. 64:2239 (Dec. 26) 1956. Robinson, H. M., Jr., et al.: South. M. J. 50:1282 (Oct.) 1957.
IN HYPEREMOTIVE ADULTS does not impair mental acuity	"... especially well-suited for ambulatory neurotics who must work, drive a car, or operate machinery." Ayd, F. J., Jr.: New York J. Med. 57:1742 (May 15) 1957.	Garber, R. C., Jr.: J. Florida M. A. 45:549 (Nov.) 1958. Menger, H. C.: New York J. Med. 58:1684 (May 15) 1958. Farah, L.: Internat. Rec. Med. 169:379 (June) 1956.

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Medical Society of the United States and Mexico

MEETING ANNOUNCEMENT

Los planes para la próxima convención de la Sociedad Médica de los Estados Unidos y México comienzan a tomar forma. La reunión se celebrará en Guadalajara el 8, 9, y 10 de noviembre y en Mazatlán el 11 y 12.

El asunto del transporte ha estimulado gran interés. El viaje por ferrocarril en ocasión de la convención en Guadalajara en el '58 tuvo tanto éxito, que se considera esta vía una de las más populares. El prestigio del Dr. Ignacio Chavez, nuestro presidente-electo, y su íntima relación con el ferrocarril harán posible, con toda seguridad, un viaje comodísimo desde Nogales. Se nos ha informado que de Guadalajara a Mazatlán hay un tren que hace el viaje de noche y llega a su destino a la mañana siguiente. Es muy posible que, para este tramo, se organice un tren especial para nuestro grupo. Ya nos hemos comunicado con un agente de viajes para que investigue la cuestión del transporte por vía aérea, an especial la posibilidad de fletar un avión desde Tucson o Phoenix.

Con toda probabilidad se creará una comision en Guadalajara y otra en Mazatlán, que se harán cargo de separar alojamiento para los señores congresistas y sus familias.

Dentro de dos meses intentamos enviar cuestionarios a los socion norteamericanos, solicitando una expresión de su intención de asistir a la convención, para establecer un cálculo bruto del número de congresistas que se espera asistan.

Mientras tanto, se solicita de aquellos socios que así deseen, se comunique con nuestro secretario americano, el Dr. M. A. Carreras, 130 South Scott, Tucson, Arizona, si se interesan en presentar alguna ponencia científica en la próxima convención.

JEF

Plans are beginning to take shape and jell again for the forthcoming meeting of the Medical Society of the United States and Mexico, to be held in Guadalajara, Jalisco and Mazatlan. Sin., on November 8 to 12 this year. As was previously announced, the Guadalajara portion of the conclave will take place on November 8, 9 and 10, while the 11 and 12 will be spent in Mazatlan.

The matter of transportation has stimulated much discussion so far. The trip by train to Guadalalajara in 1958 was so successful that this mode of transportation is considered one of the most popular. The close connection of Dr. Ignacio Chavez with the Mexican railroad will bring about, we are sure, a most satisfactory and comfortable trip from Nogales, Sonora. We are told that an overnight trip will bring the train from Guadalajara to Mazatlan. One could even guess that a special train might be set up for our group. We have contacted a travel agent to do some spade work in the matter of air transportation and to look into the possiblity of chartering an aircraft, perhaps even all the way from Tucson or Phoenix.

There will be, in all probability, a central committee in Guadalajara and one in Mazatlan, in charge of lodging reservations, with graduated choices.

By summer we will send out questionnaires to the American members solely to obtain a rough estimate of the number to be expected.

Meantime, anyone with an interesting paper to present is cordially invited to notify our American secretary, Dr. M. A. Carreras at 130 South Scott, Tucson, Arizona, at the earliest opportunity.

Juan E. Fonseca, M.D.

The Scientific Exhibit

AMA Clinical Meeting, Washington, D.C.

November 28 - December 1, 1960

Application forms for space in the Scientific Exhibit at the Washington, D.C. Clinical Meeteing of the American Medical Association, November 28 to December 1 are now available. They may be procured by writing directly to Charles H. Bramlitt, M.D., Director, Department of Scientific Assembly, American Medical Association, 535 N. Dearborn St., Chicago 10, Illinois. Applications close on August 1.

The "Hull" award will be presented for th first time at this meeting to the best exhibit on a scientific subject which has not been previously shown at a medical meeting. The award will consist of a gold medal and an honorarium of $250. The winning exhibit will be approved for showing in the Scientific Exhibit at the 1961 Annual Meeting of the AMA which will be held in New York City.

Dr. Thomas G. Hull will personally present the award to the recipient.

Topics of Current Medical Interest

ARIZONA POISONING CONTROL INFORMATION CENTER

USE OF BURNED TOAST AS A SUBSTITUTE FOR ACTIVATED CHARCOAL IN THE "UNIVERSAL ANTIDOTE"

The use of activated charcoal has been widely recommended as an emergency first aid measure in the treatment of poisoning from certain chemical agents. A preparation, known as the "universal antidote", containing 2 parts of activated charcoal, 1 part of magnesium oxide, and 1 part of tannic acid is commonly employed. The charcoal absorbs many alkaloids and other chemical agents such as phenol, mercuric chloride, and salicylates; magnesium oxide neutralizes acids without evolution of carbon dioxide gas; tannic acid precipitates certain alkaloids, glycosides, and heavy metals(1,2). In the first aid treatment of poisoning from strychnine, the oral administration of the "universal antidote" in water is considered as the safest procedure prior to premedication of the victim with barbiturates(3).

As a public service, some pharmacists prepare the "universal antidote" and distribute it *gratis* to patrons with an explanation of how and when to use it in cases of poisoning in the home. The preparation is also available commercially in many pharmacies (e.g. Res-Q). However, in many cases of poisoning in which the "universal antidote" is indicated as a first aid measure, the preparation is not available in the home. The use of substitutes for the activated charcoal, magnesium oxide and tannic acid in "universal antidote" has been suggested, namely, burned toast, milk of magnesia, and strong tea, respectively (2,4,5,6). The administration of burned toast has been specifically recommended in the treatment of strychnine poisoning in children (6). Athough milk of magnesia and tea may be considered as useful alternates in the "universal antidote" formula, the substitution of burned toast in place of activated charcoal appears unjustified.

Lucas(1) has pointed out that the charcoal used in the treatment of acute poisoning "must be especially activated and that substituting ordinary charcoal or burned toast is folly." The extent of adsorption of a substance by charcoal is dependent both on the development of a large surface area in the charcoal and a conditioning or activation of its surface. In the manufacture of activated charcoal these properties are acquired by subjecting organic material (e.g. bone, blood, etc.) to high temperatures in the absence of oxygen (destructive distillation) and by treating the residue with an activating agent such as zinc chloride at high temperatures. Charcoal for medicinal use is also washed with acid and water to remove any inorganic matter that may be present(7).

Lehman(8) has provided convincing evidence that burned toast is of no practical value as a substitute for activated charcoal in the "universal antidote". He compared the adsorptive capacity of 5 Gm. of pulverized burned toast with 1 Gm. of activated charcoal N.F. X in accordance with the requirements of the United States Pharmacopeia (U.S.P.)(9). In this test, the U.S.P. requires that 1 Gm. of activated charcoal adsorbs completely 100 mg. of strychnine sulfate from 50 ml. of water after 5 minutes of shaking with charcoal. Upon completion of this procedure, he measured the degree of adsorption by determining the median lethal dose (LD_{50}) of the filtrates by intraperitoneal injection in mice. The LD_{50} of the filtrate from the burned toast-treated strychnine sulfate solution

was not significantly different from that of the control strychnine sulfate solution. The filtrate from activated charcoal-treated strychnine sulfate solution showed no toxicity.

It is important that only activated charcoal of a high standard medicinal quality be used in the treatment of acute poisoning, and it should meet the U.S.P. requirement for adsorptive power. Andersen(10) emphasized this point when he compared the adsorptive capacity of 2 different commercial activated charcoal preparations for several chemical agents and found one of the preparations to be one-half as effective in adsorptive power as the other charcoal preparation. It should also be emphasized that activated charcoal must be preserved in well-closed containers. Because of its adsorbent power, it should never be kept exposed to the air. It will become unfit for use if subjected to the atmosphere of a laboratory or pharmacy(11).

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STATISTICS OF 79 POISONING CASES IN ARIZONA DURING MARCH 1960

AGE:

73.4% involved under 5 year age group	(58)
2.55% involved 6 to 15 year age group	(2)
10.1% involved 16 to 30 year age group	(8)
5.1% involved 31 to 45 year age group	(4)
6.3% involved over 45 year age group	(5)
2.55% not reported	(2)

NATURE OF INCIDENT:

81.0% accidental	(64)
15.2% intentional	(12)
3.8% not reported	(3)

TIME OF DAY:

31.65% occurred between 6 a.m. and noon	(25)
27.85% occurred between noon and 6 p.m.	(22)
15.2% occurred between 6 p.m. and midnight	(12)
5.1% occurred between midnight and 6 a.m.	(4)
20.2% were not reported	(16)

OUTCOME:

98.7% recovery	(78)
0.0% fatal	(0)
1.3% unknown	(1)

CAUSATIVE AGENTS:

Internal Medicines	**Number**	**Percent**
Aspirin	25	30.2
Other Analgesics	4	4.8
Barbiturates	7	8.45
Antihistamines	1	1.2
Laxatives	0	0.0
Cough Medicine	2	2.4
Tranquilizers	3	3.6
Others	10	12.05
Subtotal	52	62.7
External Medicines		
Liniment	0	0.0
Antiseptics	0	0.0
Others	1	1.2
Subtotal	1	1.2
Household Preparations		
Soaps, Detergents, etc.	0	0.0
Disinfectants	2	2.4
Bleach	6	7.3
Lye, corrosives, drain cleaners	3	3.6
Furniture and floor polish	0	0.0
Subtotal	11	13.3
Petroleum Distillates		
Kerosene	1	1.2
Gasoline	3	3.6
Others (lighter fluid)	1	1.2
Subtotal	5	6.0
Cosmetics	1	1.2
Pesticides		
Insecticides	1	1.2
Rodenticides	1	1.2
Others	0	0.0
Subtotal	2	2.4
Paints, Varnishes, Solvents, etc.	4	4.8
Plants	1	1.2
Miscellaneous	4	4.8
Unspecified	2	2.4
Subtotal	11	13.2
TOTAL	83*	100.0

*The total number of causative agents exceeds the actual number of poisoning cases since in certain individual poisoning incidents more than one agent was involved.

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TUCSON MULTIPLE SCREENING PROGRAM

Arizona State Department of Health
C. G. Salsbury, M.D., Commissioner

INTRODUCTION

A multiple detection screening program conducted by the State Department of Health and local health departments, and sponsored by county medical societies, has been carried on in Arizona for the past three years. This program has been responsible for uncovering many new cases of diabetes, tuberculosis and syphilis in all areas of the state. Probably the most successful of these programs was the one conducted in Tucson last December.

The first time these units visited Tucson was at the Pima County Fair in 1957. Inclement weather and a breakdown of the testing equipment limited the number of tests taken so that although several cases were returned to treatment, no new cases of diabetes were found. The next visit was during Diabetes Week in November, 1957. At this time 725 people were tested, twelve (12) cases were returned to treatment and two (2) new cases were found. The multiple screening units were again in Tucson during Diabetes Week in 1958. This time the Diabetes Committee of the Pima County Medical Society took over the publicity of the program. An excellent job was done which resulted in 925 blood samples taken. Seven (7) new cases were discovered and many were returned to treatment. Only one (1) case was not brought to diagnosis and this was a tourist from out of stae. Results of the tests were sent to the physician of this person, but we have never received the results of any follow-up work on the case.

THE PROGRAM

With two years experience in sponsoring and promoting a diabetes screening program, the Diabetes Committee of the Pima County Medical Society was now in a position to put on a more extensive campaign during National Diabetes Week of 1959. The Tucson Diabetes Screening Program was conducted two weeks after Diabetes Week on December 7-18, 1959. This committee, under the leadership of Marguerite Williams, M.D., took over the entire direction of the program. The city was studied for the best possible testing locations and four sites were selected. The Diabetes Committee organized and presented a two-week pre-testing educational program during Diabetes Week to inform the public about the health screening services to be offered and to motivate them to go visit the locations for the screening tests. The publicity and educational program was carried to the people via the use of the press, radio and television. Diabetes publicity material was supplied by the American Diabetes Association and adapted to local use. Several of the members of the Diabetes Committee of the Pima County Medical Society appeared on local television and radio stations as part of the educational phase of the program. Movie trailers were distributed to the twenty-four motion picture theatres as part of the publicity campaign. The local newspapers gave extensive coverage to the program both before and during the actual testing period. This publicity was so effective that the screening units were swamped during the entire testing period. At the opening of the units in the morning long lines of people would be waiting for their screening tests. By evening, the testing lines were so long that many had to be turned away and asked to return the next day.

The diabetes tests were performed using the automatic Hewson Clinitron, which screens at the 130mg% level using the Wilkerson-Heftmann blood sugar determination method. It is possible to do between fifty (50) and one hundred (100) blood samples per hour by this method. All persons who screened positive on this test were contacted personally and informed of the results of their tests, and given the opportunity to have a confirmatory retest under controlled conditions.

The retest was drawn from the person one hour after they had eaten a moderately high carbohydrate meal. These blood samples were processed in the State Health Department Laboratory using the Folin-Wu quantitative blood sugar method. Blood sugar retest readings of 170mg% level and above were considered positive, requiring further diagnostic evaluation by the private physician. Persons who had positive retests were referred to their private physician for further study. A copy of the "Arizona Diabetes Follow-up Sheet" was sent to the physician, with the results of the retest entered on this sheet. The physician was instructed by an accompanying letter to return the form when the diagnosis was completed. In cases where the re-

test reading was very high, the physician was notified by telephone, and the "Follow-Up Sheet" sent to him later. These unusually high cases were also contacted by telephone, when possible, and urged to see their physician at once.

ARIZONA STATE HEALTH DEPARTMENT
TUCSON SURVEY
Diabetes Screening Test
December 7-18, 1959

Table I	**Male**	**%**	**Female**	**%**	**Total**	**%**
Total Screened	995	100.0	1657	100.0	2652	100.0
Total Positive Screenees...	26	2.6	38	2.3	64	2.4
Table II						
Positive Screenees Retested	16	61.5	31	81.6	47	73.4
Positive Screenees **Not** Retested For Any Reason...	10	38.5	7	18.4	17	26.6
Table III						
Positive Screenees Retested at 170mg% or above	11	42.2	15	39.5	26	40.6
Positive Screenees **Not** Retested For Any Reason...	10	38.5	7	18.4	17	26.6
Total Referred to Physician.	21	80.7	22	57.9	43	67.2
Table IV						
Follow-Up Reports From Physicians						
New Cases	6	23.1	14	36.8	20	31.3
Not Diabetic	5	19.2	—	—	5	7.8
Previously Known Diabetics.	8	30.8	7	18.4	15	23.4
Ne Report Received from Physician	2	7.6	1	2.7	3	4.7
Total Referred to Physician.	21	80.7	22	57.9	43	67.2

Table I—Percentage figured on number of persons having screening test
Table II, III and IV—Percentage figured on number of positive screenees

ARIZONA STATE HEALTH DEPARTMENT
TUCSON SURVEY
December 7-18, 1959

Table V	**Male**	**Female**	**Total**
Total Blood Tests Taken For Serology	995	1657	2652
Total Positive Screenees	18	22	40
Disposition of Positive Serology			
Brought To Treatment	3	4	7
Returned To Treatment	—	1	1
Adequate Treatment	10	5	15
Not Infected	3	3	6
Other Disposition	2	4	6
No Disposition	—	5	5
Table VI			
Total X-Rays Taken	993	1461	2394
Total TBC And Suspects	20	16	36
Total Other Pathology	38	37	75

Dispositions are not completed on positive tuberculosis and other pathology.

RESULTS

A total of 2,652 blood samples were taken (See Table I). Of these, sixty-four (64) or 2.4% reacted positive to the diabetes screening test. The positivity rate was slightly higher for the males than the females, but not significantly so.

Table II shows that forty-seven (47) of the sixty-four (64) positive screenees were retested using the Folin-Wu quantitative test. Of the seventeen (17) positive screenees not retested, fifteen (15) were known diabetics and as such were not retested. It was the policy of the testing team never to test a known diabetic unless specifically asked to do so by the patient's physician. However, many times the patient would not correctly answer the question "Have you ever been diagnosed or treated for diabetes?" The field investigator would discover this information later on visits to positive screenees. The other two patients, who were not retested by the screening team, preferred to go directly to their private physician for confirmatory retests.

Table III shows that twenty-six (26) of the forty-seven (47) positive screenees retested showed blood sugar levels of 170mg% or more. All these patients were referred to their physicians for further evaluation. The twenty-one (21) positive screenees whose blood sugar levels were under 170mg% were informed that they may be in a potential diabetes group and that it would be well to see their physician and take his advice as to whether or not they should have periodic examinations for diabetes in the future. Physicians were sent a copy of all retest readings.

Table IV represents the referral and disposition of total positive screenees retested at 170mg% or above, and positive screenees not retested for any reason. Of the forty-three (43) persons referred to physicians for diagnostic evaluation, twenty (20) were subsequently diagnosed as new cases of diabetes. Follow-up activity has been completed on all except three of the positive reactors. This represents a new high in a screening and referral program.

Table V is a statistical breakdown of blood tests taken for serological study. Only one sample of blood is drawn at the time of screening, this sample is used for both the RPR test for syphilis and the screening test for diabetes.

Table VI shows the total number of x-rays taken and the positive findings. Follow-up has not been completed on positive findings as of this date.

SUMMARY

The Diabetes Committee of the Pima County Medical Society had experience sponsoring diabetes screening programs during Diabetes Week in 1957 and 1958. They put this experience to good use during Diabetes Week in 1959. They took over the direction of the screening program conducted at this time in conjunction with the State Department of Health and the Pima County Health Department. The publicity before and during the screening program was so skillfully handled that testing teams were swamped with people wanting blood sugar tests. A total of 2,652 blood samples were drawn. This resulted in sixty-four (64) positive screenees with twenty (20) new cases of diabetes being discovered and fifteen (15) other cases being returned to treatment. Follow-up work has been completed on all except three positive reactors. This represents a new high in a screening and referral program.

Reprints

An Analysis of Effects of Nuclear Attacks on Tucson and Phoenix*

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INTRODUCTION – The problem of world-wide fallout of radioactive fission products from peacetime nuclear bomb tests has, in recent years, received both careful scientific attention and wide public discussion. It is remarkable that the vastly more serious problems that would arise in the event of actual nuclear war have, by comparison, received only slight scientific notice and almost no public discussion. The problems confronting a population under nuclear attack are exceedingly complex scientific problems that will only be grasped by the public at large after they have been analyzed and repeatedly interpreted to the public by many scientists.

But even when given predictions based on theoretical damage calculations such as those to be presented here, the layman will probably not immediately accept the dire implications. The person who has not himself carefully traced through the inexorable sequence of physical processes initiated by detonation of a nuclear weapon and who is not himself accustomed to drawing quantitative inferences from theoretical or semi-theoretical arguments is all too likely simply to reject the nuclear attack inferences as unpleasant speculations or to pass them off with some superficially fatalistic remark. This likelihood makes it all the more urgent that more scientists perform an interpretive role in what is a vitally important educational program. No matter how viewed, it is indispensable that all members of the public be made much more clearly aware of what can happen to them in event of nuclear war. The present analysis of effects of nuclear attacks on two Arizona cities is chiefly aimed at the intermediate goal of providing members of the Arizona scientific community with reference data that might prove useful to them in carrying out this interpretive function whenever opportunity arises.

As will be made clear below, there are a number of regional characteristics that make survival in Arizona a distinctly different problem from that of survival in other geographical areas under nuclear attack. On the other hand, many of the basic bomb phenomena that pose these problems will be essentially the same for Arizona as for any other area. Quantitative information on high-yield bomb phenomena has recently been made available through publication by the United States Atomic Energy Commission of its report, *The Effect of Nuclear Weapons* (AEC, 1957). This report has been my principal source of bomb-effect data in preparing the present analysis. Scientifically trained persons will find it very informative; but I would fear that the layman could not fully develop from it the image of bomb destruction that lies latent in many equations, graphs, and nomograms.

In addition to the above main reference, a very useful supplementary discussion, particularly informative on physiological and genetical

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topics, has been published still more recently by the Government of India (India, 1958). Beyond these two major references, one finds only a handful of scientific papers on the present subject, a measure of the dangerously limited attention that has thus far been given to the question of the prospective nature of nuclear warfare.

Never before in man's history have questions of the detailed mechanics of warfare been so intimately the concern of the civilian population. Never before have such questions been interwoven so tightly with complex technical matters.

DISCUSSION OF ASSUMPTIONS — It will be assumed here that the two most likely targets of nuclear attack in Arizona are the Tucson and Phoenix areas. Ground zero, the point of hypothetical bomb detonation, will be taken to be within the boundaries of Davis-Monthan AFB for the case of Tucson, but will be put in the downtown area in the case of Phoenix. More specifically, Tucson ground zero will be set at the intersection of Ajo Way and Swan Road extended, while Phoenix ground zero will be arbitarily set at Central and Van Buren. Granting target value to such points, it remains obvious that ballistic errors could shift ground zero several miles in any direction, but this probability will not be considered in the following discussion.

It will be assumed that an enemy weapon of 20 MT yield (1 MT = explosive energy equal to that of 1 megaton TNT) is delivered to each target. In support of the reasonableness of this assumption the following points may be noted: (1) A weapon of 20 MT yield is adopted in the Indian analyses (India, 1958) as the "nominal high-yield weapon." (2) In the 1957 Holifield Subcommittee discussions of Operation Sentinel, an analysis of a hypothetical nuclear attack on this country, it was reported that weapons of 5, 10, and 20 MT were assumed to be delivered to selected target cities, suggesting that capability of delivery of a 20 MT weapon must now be reckoned with (Joint Com. on At. Energy, 1957, Pt. 1, pp. 135-141). Hence Tucson, at least, must be regarded as a potential 20 MT target because it is the site of one of only thirty-odd continental SAC (Strategic Air Command) bases, and it is widely recognized that SAC bases are now highest-priority targets for a would-be aggressor. (3) Release of 20 MT requires fission of only about a ton of missile materials. This much net fission might reasonably be expected (India, 1958) to result from packaged weapons weighing, say, five to ten tons. In late 1958 an Atlas missile sent into an orbit of 900-mile apogee height a last-stage vehicle weighing over four tons; Russia has already done much better. Thus it seems prudent to assume that advances in weaponry and missile propulsion will place 20 MT warheads at the disposal of potentially hostile ICBM (intercontinental ballistic missile) groups in the near future, if, indeed, this possibility has not already been realized. (4) Finally, for the case of Tucson, further reason for regarding 20 MT as not only reasonable but possibly even too low a weapon yield is found in the fact that Davis-Monthan AFB is currently under consideration as a prospective ICBM launching site. It has been estimated (Lapp, 1959) that to knock out the type of reinforced-concrete subterranean launching installations that are planned for such sites, enemy weapons must combine megatonnage and accuracy such as to impose blast overpressures of 100 psi upon these "hardened sites." Present missile accuracies, Lapp concludes, would dictate use of enemy weapons of well over 20 MT yield against such sites, 100 MT being not too much from an aggressor's viewpoint.

In all, the 20 MT assumption seems quite justifiable, albeit speculative. Assumption of a 5 MT or 10 MT weapon for the Phoenix attack might seem militarily more reasonable, but for simplicity of analysis, a 20 MT yield will be assumed for both cases.

Finally, it will be assumed that a *surface burst* rather than an air burst occurs at each target. It is omniously significant that all 2500 megatons which were assumed to be delivered to a total of 144 American cities in the Operation Sentinel paper-exercises were taken to be surface bursts. Although certain types of blast effects and all types of thermal radiation effects are much more injurious from air bursts than from surface bursts, the potential killing power of weapons in the megaton range resides above all in the *local fallout*, and, as we shall see below, this potential can only be realized in surface bursts.

Having set out the assumptions to be used,

we may next examine the consequences of surface detonation of 20 MT weapons at the specified ground-zero locations in Tucson and Phoenix. It will be convenient to consider, in turn, blast effects, initial nuclear radiation effects, thermal radiation effects, and local fallout effects, and then to discuss questions of evacuation and survival of persons living near the hypothetical target areas.

BLAST EFFECTS — The first category of bomb damage, blast effects, will be discussed in three parts: fireball- and crater-formation, shock-wave destruction, and aerodynamic drag destruction.

Fireball- and crater-formation. — The energy-yielding fission process is accomplished within a time of the order of a microsecond after detonation, the attendant energy release raising to a very high temperature and pressure the fission products, the fissile but unfissioned residue, and the weapons case, all of which are rendered gaseous as a result of the million-degree temperatures developed. The sudden expansion of these incandescent gases forms the *fireball,* sets up an intense *shock wave,* and blasts out a large *crater* (in the case of surface bursts). The fireball rapidly expands to a maximum diameter of about two miles in a time of the order of ten seconds for the case of a 20 MT weapon, and concurrently accelerates buoyantly upward. Attaining maximum vertical velocities of the order of several hundred feet per second, the fireball and entertained air ascend through the entire troposphere and on into the stratosphere, the mushroom cloud reaching maximum altitudes of about 115,000 feet in a total elapsed time of only about ten minutes after detonation. (Unless otherwise specified, all numerical magnitudes are to be assumed applicable just to the 20 MT surface bursts here considered.)

A crater of diameter about 3500 feet and central depth of 300 feet is formed, and a portion of the removed soil and rock is blasted up into the fireball before the latter can get away in its buoyant ascent. It is this entrapped fraction of total crater-debris that becomes the vehicle for bringing back to earth the radiologically lethal fission products in the form of the local fallout.

A crater three-fifths of a mile across and of depth equal to the height of a 25-story building is impressive even in a state containing Diablo Crater and the Lavender Pit, but the total number of casualties and the total material damage directly attributable to crater-formation comprises only a minute fraction of the overall bomb effect. A much more potent feature of the explosion is the shock wave which we consider next.

Shock-wave destruction. — A hemispherically expanding shock wave propagates out from ground zero, initially with speeds of the order of four or five times that of sound, too fast for the material expansion of the fireball to keep pace, giving rise to early "breakaway" of the shock front from the fireball proper. As the shock front passes a given object, there occurs a sudden rise of pressure exerted on that object. The excess of post-shock pressure over initial barometric pressure is termed the *over-pressure.* As the shock wave diffracts around any large building, a very large overpressure acts selectively upon that side of the building nearer ground zero during the time required for the shock to propagate along the building to the far side. If the building or object is not too small and its ultimate strength not too great, the unbalanced lateral force may act for long enough (impulse great enough) to cause the structure to fail. Such damage is said to result from *diffraction loading,* since it takes place during the period within which the wave is engulfing (diffracting around) the structure. Well-closed buildings (and automobiles) also suffer an overall crushing action even after engulfment by the shock, but this type of damage is conveniently lumped together with true diffraction damage. In both of these cases, the degree of damage proves to be chiefly dependent upon the magnitude of the peak overpressure, and hence falls off with increasing radial distance from ground zero at a rate fairly accurately predictable from shock-hydrodynamical laws.

For reference use, the distance-variations of several parameters associated with the shock wave from a 20 MT surface burst are displayed in Table 1. For each of three radial ranges (r) in miles from ground zero, there is shown the peak overpressure (p) in pounds per square inch (psi), the shock-wave arrival time (t_1) in seconds, the duration of the positive overpressure phase (t_2) in seconds, the maximum wind speed (V_3) in miles per hour, and the associated peak dynamic pressure (q) in psi.

The last two quantities will be of interest in the later discussions of *drag damage*.

Table 1. Distance-variation of several shock-wave characteristics for a 20 MT surface burst. See text for definitions of tabulated quantities.

r (mi)	p (psi)	t_1 (sec)	t_2 (sec)	V_3 (mph)	q (psi)
5	10	11	7	300	2.3
10	3.4	30	10	115	0.27
15	1.8	51	12	70	0.07

From bomb-test data and from other considerations, extensive tables and graphs (AEC, 1957) have been prepared for use in estimating diffraction damage under a wide variety of specified conditions. For the hypothesized conditions of the Arizona attacks, one finds from these reference data that woodframe houses will be *totally destroyed* out to about 8 miles from ground zero as a result of occurrence of peak overpressures of up to about 5 psi out to that distance. Brick houses, so common in southern Arizona, suffer damage in apparently the same way at about the same peak overpressures as do woodframe houses (AEC, 1957) photographs, pp. 128-134). Only specifically reinforced houses of non-standard type can remain standing after passage of a shock with 5 psi overpressure. Woodframe and brick houses will, furthermore, be "badly damaged" (i.e., frames shattered so that structures are for the most part collapsed and will require major repairs before they could again be lived in except on emergency basis) out to a radius of about 17 miles, and will be "moderately damaged" (i.e., will have windows broken, doors blown in, and interior partitions cracked) out to a radius of 40 miles from ground zero. In Figures 1 and 2 the areas concentric with ground zero at Tucson and Phoenix within which the first of these three damage categories prevails have been indicated by 8-mile-radius circles. In Figure 2, which has been drawn to a smaller scale to permit delineation of longer-range bomb effects (that would be of more concern near Phoenix due to the presence of numerous surrounding communities), there is also shown the 17-mile limit of "badly damaged" homes that would require extensive or even prohibitive repairs before they could be made livable. Figure 2 reveals that in event of a 20 MT attack on Phoenix, *all* homes will be demolished not only throughout all of Phoenix proper but also eastward to Tempe, southward to the South Mountain Park area and northwestward to the edge of Glendale, many being destroyed even in Scottsdale and Tolleson. Homes will be partially collapsed in such distant communities as Mesa, Chandler, Goodyear and Marinette because even that far from ground zero the shock wave will arrive, about one minute after detonation, with peak overpressures in excess of 1.5 psi.

Although I know of no population-density data suitable for use in deducing from Figures 1 and 2 the expected number of persons whose homes would be destroyed, familiarity with the case of Tucson leads me to estimate that at least 90 per cent of the population of greater Tucson would find itself homeless within a bit

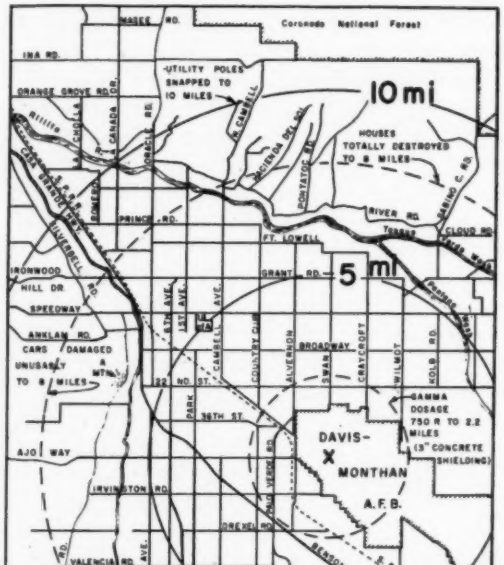

Fig. 1

under half a minute (see Table 1) after detonation. Inspection of photographs (AEC, 1957) of typical homes subjected to diffraction damage at the 5 psi level suggests that a heavy majority of the persons who were inside those homes at instant of shock-wave arrival would be dead or seriously injured within that same period of time as a result of mechanical injuries sustained during demolition of their homes. The Japanese experience strongly confirms this.

Multi-story brick buildings of the general grade of construction found in apartment houses

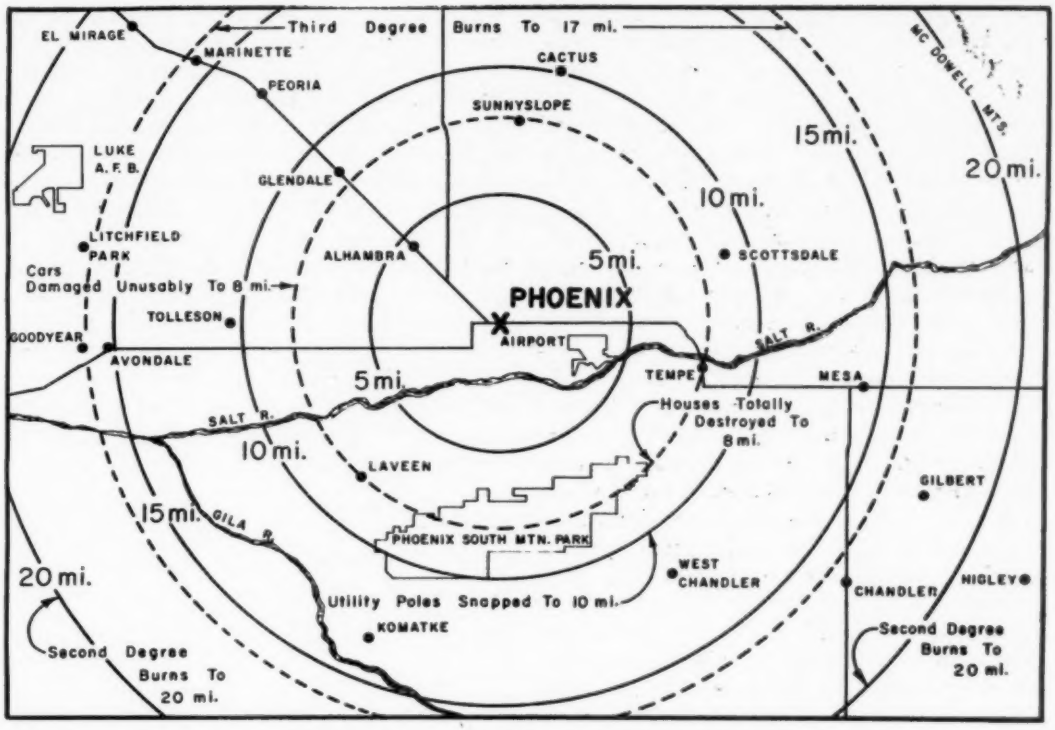

Fig. 2

would be totally destroyed out to a radius of rather more than 5 miles, and multi-story buildings with heavy reinforced-concrete frame and walls would be totally destroyed out to about 4 miles from ground zero and would be unusably damaged out to well over 5 miles. Thus, total destruction or heavy structural damage would be inflicted on Tucson Medical Center, U. S. Veterans Hospital, University of Arizona, and all downtown buildings in the case of Tucson, and similarly on the Arizona State Hospital, the U. S. Indian School, Grand Canyon College and all structures in the heart of Phoenix. All buildings and facilities at the municipal airports of both cities would be leveled.

Automobiles and other vehicles may be damaged both by diffraction loading (bodies crushed, frames sprung) and as a secondary result of the type of drag loading to be discussed in the next section, as well as by impacts from secondary missiles (rocks, bricks, timbers) torn from nearby structures. Nomograms for use in estimating vehicle damage are available only for the case of heavy trucks. Class C damage to heavy trucks implies "turned over and displaced, badly dented, frames sprung, need major repairs" and is found to occur within about an 8-miles radius of ground zero for a 20 MT surface burst. Passenger cars will suffer such damage to an even greater range from ground zero than will trucks due to the generally lighter construction of cars. But conservatively taking 8 miles as the radial limit of the area within which vehicles of all types would need major repairs before being drivable, one sees that evacuation of most of the surviving population of Tucson would have to be carried out without benefit of cars or trucks. About the same number of persons would face foot-evacuation in Phoenix, but this number would, of course, represent a smaller fraction of the total population of greater Phoenix. Widespread destruction of vehicles, along with other insuperable obstacles to vehicular evacuation, appear to have been ignored in current civil defense planning, possibly on the now outdated assumption that preattack warning will be received in time to evacuate before detonation.

Aerodynamic drag destruction. — Coming immediately after arrival of the shock wave are the

high-speed winds that blow just behind the shock front itself. In Table 1, the values of V_3, the maximum air velocity developed just behind the shock wave, are given for three radial ranges from ground zero. In meteorological terminology, these blast winds would be spoken of as tornadic to well beyond 5 miles radius and of hurricane intensity to well beyond 10 miles. When so described, their ability to add appreciably to total bomb damage may seem more obvious. It is important to note that many types of structures inherently invulnerable to diffraction damage are demolished by drag damage during passage of these post-shock winds. Such objects as radio towers, utility poles, and trees have component members only a few inches or feet in thickness, so the shock wave, even when it has slowed down to sonic speeds, will advance from the near to the far side in a millisecond or less, too brief a time to produce much diffraction damage. That is, the total *impulse* delivered to such small objects during the diffraction period is too small to be very significant; and, of course, simple crushing action on the usually solid members of this class of objects is quite insignificant. But as the shock passes on and the post-shock winds rise to velocities of the magnitude indicated in Table 1, aerodynamic drag forces build up to values that may be well beyond the ultimate strength of the structures and failure occurs. Some objects fail due to combined diffraction loading and drag loading, automobiles being a case of great importance. After having the hood and top crushed and the frame sprung during the first millisecond after arrival of the shock front, the car may be rolled along the ground or flung bodily against resistant structures by drag forces.

For present purposes, primary interest centers on two very common types of drag-vulnerable objects — wood utility poles (telephone and power poles) and trees. In Tucson and Phoenix, unlike cities in areas with more abundant vegetation, blown-over trees will be generally less of an evacuation problem than blown-over utility poles, but even the generally sparse and generally low trees typical of Arizona cities would so litter streets with branches and limbs as to greatly complicate vehicular evacuation even if no other obstacles to motorized evacuation existed.

Experience with storm damage of a variety of types leads to the rule-of-thumb (AEC, 1957) that 30 per cent of trees of average type go down at about 100 mph, and 90 per cent go down at 140 mph. Using the appropriate scaling laws, one finds that in the hypothesized attack, 90 per cent of the trees within somewhat over 8 miles from ground zero will go down and 30 per cent will go down out to almost 11 miles. Even in an area with only 30 per cent of all trees down, it takes little imagination to see the sharply reduced probability of being able to use a car for evacuation purposes. A single tree blown across a driveway might prevent car-evacuation by an elderly couple or by a household in which the father was at work, or might at least delay evacuation for an hour or two — a delay that could be rendered fatal by fallout.

The distance from ground zero out to which wood utility poles are snapped depends upon whether one considers poles with lines arrayed transversely or radially, since in the former case, aerodynamic drag forces exerted on the wires add to pole drag in building up a large bending moment near the pole base. The AEC nomograms yield a radius of about 10 miles (peak post-shock wind velocity over 110 mph, Table 1) for the distance from ground zero to the limit of the area within which poles bearing *radial* lines will snap, and 13 miles for the corresponding limit to which poles carrying *transverse* lines will go down.

Referring to Figures 1 and 2, one sees that this implies that *all* wood telephone and power poles throughout greater Tucson would go down, and that the same would be true not only in Phoenix proper, but even in Tempe, Scottsdale, Sunnyslope, and Glendale. Drive through any one of these communities examining the network of lines and poles, visualize all of these thrown down in ray-like pattern pointing away from ground zero, and estimate the finality with which this would eliminate hope of vehicular evacuation of these cities. Even in wide arterial streets within a ten-mile radius of ground zero, where fallen poles alone might not rule out slow go-around traffic, the maze of wires festooned over trees and houses and sagging erratically across the streets would preclude penetration by vehicles for tens of hours even if there were all-out effort by all survivors to clear the streets. But survivors have not tens of hours, only tens of minutes, in which to evacuate before fallout

begins to arrive from the stratospheric mushroom cloud, so utility-pole damage alone would dictate evacuation *on foot*, even if vehicle damage did not also require walking evacuation.

Because utility-pole failure, by itself, so adversely influences evacuation prospects, and because pole-failure is one of the few types of bomb damage simple enough to be roughly analysed in terms of basic physical principles, I have made an effort to check the above figures derived from the published damage-nomograms. From a local telephone company I have determined that 35 feet is a good working average pole-height and 10 inches a reasonable basal diameter. Western red cedar is the most widely used type of pole in this area and has an ultimate fiber stress of about 5600 psi (Kurtz, 1942). The problem becomes that of estimating whether the maximum fiber stress near the 10-inch diameter base of a 35-ft cedar pole carrying a plausible number of lines of reasonable diameter and span will exceed 5600 psi just after the shock wave passes. Numbers and sizes of lines vary considerably, but it will be reasonable to consider six lines of 200-ft span, each of 0.30-in diameter, strung transversely at 10 miles from ground zero, where Table 1 shows peak wind speeds of 115 mph occurring. The Reynolds number for airflow about a pole under these conditions is found to be about 6×10^5, that for airflow about the wires only 2×10^4. The drag coefficent for a cylinder at the latter Reynolds number is 1.2, but for the former is only about 0.3 (assuming development of a fully turbulent boundary layer above the critical Reynolds number near 4×10^5). The bending moment due to wire-drag may be assumed to operate through a lever-arm of 30 ft (wires averaging 5 ft below pole top), but the pole-drag behaves as a uniformly distributed load, if we ignore pole-taper. The section modulus at the base is here about 100 in^3, and hence the total bending moment at the base, found on the above basis to be 5.7×10^5 in-lb, implies a maximum fiber stress of about 5700 psi, slightly in excess of the ultimate strength of western red cedar. Hence one would expect the pole to snap near the ground under the assumed conditions. It will be seen that this calculation, taken alone, indicates that pole-failure with transverse lines should be observed only to radii slightly greater than 10 miles from ground zero in contrast to the 13-mile limit previously derived from the AEC nomograms. However, it seems likely that the latter not only incorporate more reliable statistics on pole-size, line-size and line-span than used here, but also include empirical allowance for physical effects that transcend simple wind-tunnel experience with respect to drag forces on cylinders, so the present calculation will only be regarded as showing that the published data on pole-damage must be essentially realistic.

As an indication of probable density of barricading utility lines per unit length of city thoroughfare, I have made counts in Tucson of the number of overhead lines crossing measured stretches of various streets. On main thoroughfares well within the city, counts taken over a total of 13 miles averaged 60 transverse lines per mile. On secondary streets in residential areas, where numerous feeder lines are strung, a 5-mile check gave 95 miles per mile, or about 50 per cent higher than for main streets. If we assume that a survivor using a hypothetically undamaged car must drive a half-mile on residential streets to get to an arterial street, and then must drive, say, three miles to be entirely outside the metropolitan area, he must expect that some 220 utility lines will be down transverse to his route. Even if only a small fraction of these were sagging above ground, suspended on partially collapsed homes or untoppled trees, they would constitute a highly effective barrier to vehicular evacuation, even ignoring the downed poles themselves. Perhaps herein we have one facet of nuclear-bomb-damage whose human consequences can be vividly imagined by laymen if suitably emphasized.

INITIAL NUCLEAR RADIATION EFFECTS. – It has become customary to identify as the "initial" nuclear radiation that which is emitted from the fireball within the first *minute* after detonation. The basis for this is arbitrary, yet simple in principle: the rapidity with which buoyant forces act to accelerate the fireball implies that in about one minute the fireball and its radioactivity is carried several miles aloft, too far above the earth's surface for even the most energetic gamma rays to penetrate the atmosphere below to cause injury to persons on the ground.

The gamma dosage received by persons near ground zero depends upon the nature and thickness of absorptive material shielding them. For gammas of energy range typical of initial radia-

tion (average energy about 4.5 mev), the half-value thicknesses (depth of shielding required to halve the gamma flux) of several common materials run as follows (AEC, 1957): steel, 1.5 in; concrete, 6 in; dirt, 7 in; and wood, 23 in. Probably 3 in of concrete equivalent shielding is a reasonable average for city-dwellers as a whole, which implies an almost negligible shielding factor of 1.3. From the scaling laws for predicting gamma dosage, one finds for the hypothesized conditions that persons behind 3 in of concrete will receive an essentially lethal dose of 750 r (roentgens) out to 2.2 miles radius from ground zero. Beyond this circle the gamma dosage diminishes extremely rapidly so already at 3 miles from ground zero the dosage is only 30 r. The physical explanation is that the atmosphere has a half-value thickness of about 1000 ft for the gammas.

Whole-body dosage of 750 r is lethal in the sense that death is nearly certain within a time of the order of a *few weeks*. The persons irradiated would, however, note no *immediate* effects other than a tingling sensation in the skin. But all of this is really of only academic interest, for although this destiny of dying of radiation sickness within a few weeks is established with the speed of light, real and immediate death of these lethally irradiated persons near ground zero is effected only a few seconds later when the actual shock wave arrives with peak over-pressures of about 45 psi followed by blast winds of over 800 mph sweeping over the rubble. The conclusion seems almost inescapable that there will never be nuclear-attack deaths directly attributable to the effects of initial nuclear radiation. If one is not adequately shielded from the gamma radiation he is surely not adequately shielded against the tremendous blast effects characteristic of the area within the two or three miles of ground zero wherein this type of radiation death is even possible. (Radiation death from local fallout, it must be emphasized, is quite another matter. In the above we have considered only gamma irradiation from the fireball itself during the first minute after detonation.)

THERMAL RADIATION EFFECTS. — The incandescent fireball acts roughly as a blackbody emitter whose effective temperatures start in the million degree range. A peculiar phenomenon that prevents almost all the radiation from leaving the fireball in the early stages is the shock-heating that produces a hemispherical shell of air that is opaque to the short-wavelength emissions from the fireball during the first millisecond or so before the fireball temperatures fall to more terrestrially common values. Subsequently, the decrease in intensity of the shock-heating as the shock wave expands and grows less intense unmasks the fireball at about a second after detonation, at which time the effective emission temperature is near 8000° centigrade. Then, during the period from about 2 to 20 seconds after detonation, the ascending fireball acts as an exceedingly dangerous thermal radiator, whose effects we now consider.

Two thermal radiation effects become of human importance: *flash-burning of skin* and *ignition of inflammable materials*. Both are less severe for surface bursts than for air bursts, since in the former case the fireball is still low over ground zero when emitting most intensely, and the usual low-lying dust as well as actual objects (trees, buildings) impose more absorption on the radiations under these geometrical conditions than in the case of an air burst at several thousand feet above terrain. Experience indicates that by taking 60 per cent of the distance at which a given radiative energy is received from a typical air burst one gets the corresponding distance for that energy in a surface burst.

One finds, in this way, that the effective thermal radiation loads are here 160 cal/cm^2 at a radius of 5 miles from ground zero, 36 cal/cm^2 at 10 miles, 16 cal/cm^2 at 15 miles, and 12 cal/cm^2 at 20 miles. On the other hand, for the time-temperature characteristics of a 20-MT fireball, the energy required for a first-degree skin burn is 4 cal/cm^2, for a second-degree burn 8 cal/cm^2. Therefore, in the hypothetical Tucson and Phoenix attacks, third-degree burns will be received by persons caught in the open within about 17 miles of ground zero, second degree burns within about 20 miles, and first-degree burns out to about 27 miles (see Figures 1 and 2). The seriousness of any of these three classes of burns is a function of total skin-area burned, of course. Clothing of some types will afford protection, but severe burns can be received right through many fabrics of the light weight commonly used for shirts and dresses most of the year in southern Arizona.

Noting from the above results that the radiative loads received within 10 miles of ground zero exceed *three times* the intensities sufficient

to inflict *third-degree* burns, one must conclude that throughout all of Tucson and Phoenix proper, persons who happen to be outdoors and who do not take evasive action within seconds of detonation will suffer very severe flash burns on face, hands, and other exposed or thinly protected areas. (It is relevant to recall that about a third of the World War II Japanese A-bomb fatalities resulted from such flash burns from air bursts emitting only a thousandth of the radiation of the 20 MT weapon here considered.) Anyone with presence of mind to take immediate cover upon appearance of the first fireball glow can eliminate much of the danger of thermal radiation burn if he happens to be many miles from ground zero, since the total damage is spread over about 20 seconds. Very near ground zero, however, one would absorb 11 cal/cm^2 too quickly to make evasive action so decisive (e.g., at 5 miles from ground zero, one could absorb 11 cal/cm^2 in only about 2 seconds).

The immediate thermal radiation danger to persons caught in the open at moment of detonation does not end with skin burns, however, for these persons may find their clothing ignited by the thermal radiation. Of the fabrics whose ignition thresholds are published, those most representative of the types of clothing common in southern Arizona run as follows: cotton corduroy (brown), 11 cal/cm^2; cotton shirting (tan), 13 cal/cm^2; cotton denim, used (blue), 13 cal/cm^2; and cotton sheeting, unbleached, washed (cream), 30 cal/cm^2. Comparing these ignition requirements with the intensities cited above, we conclude that almost any typical clothing would flash into flames within Tucson and Phoenix proper; and most clothing would, in fact, be ignited in exposed locations out to somewhat beyond 15 miles from ground zero (e.g., in Mesa and Peoria or in Vail and Sahuarita). Little imagination is required to see how greatly the problems of evacuation and sheer survival are magnified by the probability that very large numbers of persons in the target communities will receive severe burns, either from direct radiation or from burning clothing. Or, put in still more vivid (but, I believe, not unrealistic) terms, one may reflect upon the way in which a *single family's* evacuation efforts might be slowed down or brought to a halt by thermal radiation burns suffered by only a *single member* of the family. Target-area hospital facilities would either be destroyed or so damaged that nothing like adequate first-aid treatment for victims with burns and other injuries would exist, needless to say.

Turning next to ignition of fires in materials other than clothing, we find that coarse grass, igniting at about 1[6] cal/cm^2, would flash into flame out to 15 miles, and fine grass, igniting at only about 10 cal/cm^2, would be in flame out to beyond 20 miles from ground zero. Leaves of deciduous trees (12 cal/cm^2 ignition threshold) would be aflame to about 20 miles, dry pine needles to about 14 miles. The Tucsonan would, within a half-minute after detonation, find most of the front range of the Catalina Mountains a nearly solid bank of flaming vegetation. The radiative ignition of grass and leaves would precede arrival of the post-shock winds for all points beyond about seven or eight miles from ground zero. Perhaps the winds would extinguish the flames in some cases, but in others these winds would probably serve chiefly to increase the fires. In any event, it seems very likely that throughout an area extending for many miles around ground zero, fires would be developing in the ignited and wind-strewn litter, adding still further physical and psychological obstacles to evacuation. Running water would almost certainly be unavailable for use in fighting such fires. Nevertheless, the chance of a major conflagration, a storm-fire, seems small since the average tonnage of combustible vegetation per acre is much lower in Arizona cities than, say, in cities in the East. Somewhat offsetting this advantage is the disadvantage that ignitibility is much greater for dry than for moist plant materials. Large numbers of small fires would seem the reasonable prediction, except in the foothills grasslands areas (e.g., Catalina foothills area north of Tucson) where the vegetation density might be sufficient to carry the fire, thus creating locally serious hazard to evacuation and possibly even to survival.

It is very much more problematical to try to estimate numbers of casualties from thermal radiation effects than from blast effects because radiation injury depends so critically on degree of exposure to the rays from the fireball. An extremely rough guess would be that, at any one time of the *daylit* period, some 10 per cent of the population might be out of doors in exposed

spots (very much lower at night). The Japanese experience shows that persons near windows or other openings in houses may also be seriously burnt, but it is not possible to allow quantitatively for this contingency. On the 10 per cent assumption, some 20,000 persons in Tucson and 30,000 persons in Phoenix proper would receive third-degree burns on exposed skin surfaces and suffer from probably still more serious clothing burns due to almost 100 per cent certainty of ignition of clothing on all persons out of doors within ten miles of ground zero. The number of burn casualties outside of the limits of these two cities would also be significant, especially in the Salt River Valley area with its numerous small communities surrounding Phoenix.

LOCAL FALLOUT EFFECTS. — The last bomb effect to be considered here is also chronologically the last to occur but is by far the most serious hazard to survival after nuclear attack when weapons in the megaton range are involved.

The surface-burst fireball blasts into itself some million tons of debris (a small fraction of the total soil and rock removed in crater-formation at ground zero), instantly vaporizes it, and mixes the resultant gases with the gaseous fission products as the fireball buoyantly ascends. Within about a minute later the fireball, now several miles aboveground, has radiatively and expansively cooled to the boiling point of the soil materials and then to their solidification point (order of 2000° centigrade), during which two stages the soil materials recondense into droplets and then solidify to form tremendous numbers of very small solid particles upon which the fission products may themselves condense. Apparently an efficient process, this sequence of events puts the radioactive fission products on particles whose terminal fall velocities are large enough to bring them back down to earth before their radioactive decay has reduced their general activity below the radiological danger point.

The result: This *local fallout* of contaminated particles covers the ground for *thousands of square miles* around and downwind from the target area with a lethally intense though invisible film of gramma-emitting dusts over which it will be unsafe to walk for post-detonation times of the order of many *days*. As dangerous as are the blast- and radiation-effects previously discussed, the radiological effects of local fallout are much worse. "For the thermonuclear weapons now in development and production, the direct effects of the explosive energy sink into relative insignificance when compared with their radiological effects" (India, 1958, p. 7).

Local fallout must be carefully distinguished from the currently-occurring *worldwide fallout* of bomb-test radioactivity. The latter is, by contrast, very slow and of low intensity since it results from air bursts or else from low-yield tower bursts, neither of which provides soil debris particles to bring down the fission products in their early state of intense activity. Megaton surface bursts, on the other hand, begin delivering the fission products, via local fallout, to the countryside within an hour or less, at which time the contaminated dusts still act as sources of gamma radiations of great penetrating and killing power.

A striking characteristic of mushroom-cloud formation is the cloud's almost immediate horizontal expansion to radii of tens of miles once it enters the stable stratosphere. For the 20 MT weapons here considered, the mushroom cloud will spread out (Kellogg, and others, 1957) to a radius of about *30 miles* within about *ten minutes* after detonation. That is, ten minutes after the hypothetical Phoenix detonation a massive cloud will stretch from Buckeye to Apache Junction, from Maricopa to New River, and the Tucsonan would find himself under a cloud reaching from Pantano to beyond Marana, from Oracle to about Amado. Pacific bomb-test experience indicates that final stabilized mushroom-cloud radii of as much as 50 miles may occur. What will be the subtle psychological effect exerted on already stunned target-area personnel by the almost instanteous imposition of this huge dark cloud above them?

But there are worse than psychological hazards in the cloud, for it will be radioactively contaminated out to a radius of at least 20 miles, so it is from a disc of 40-mile diameter concentric with ground zero that the rain of radioactive dust starts down. What this means to the evacuee is that he must very quickly get some 20 miles out from ground zero if he is to be sure of avoiding the local fallout. When wind-drift is taken into account, one sees that a critically important point is to evacuate towards the upwind direction, where "upwind" means

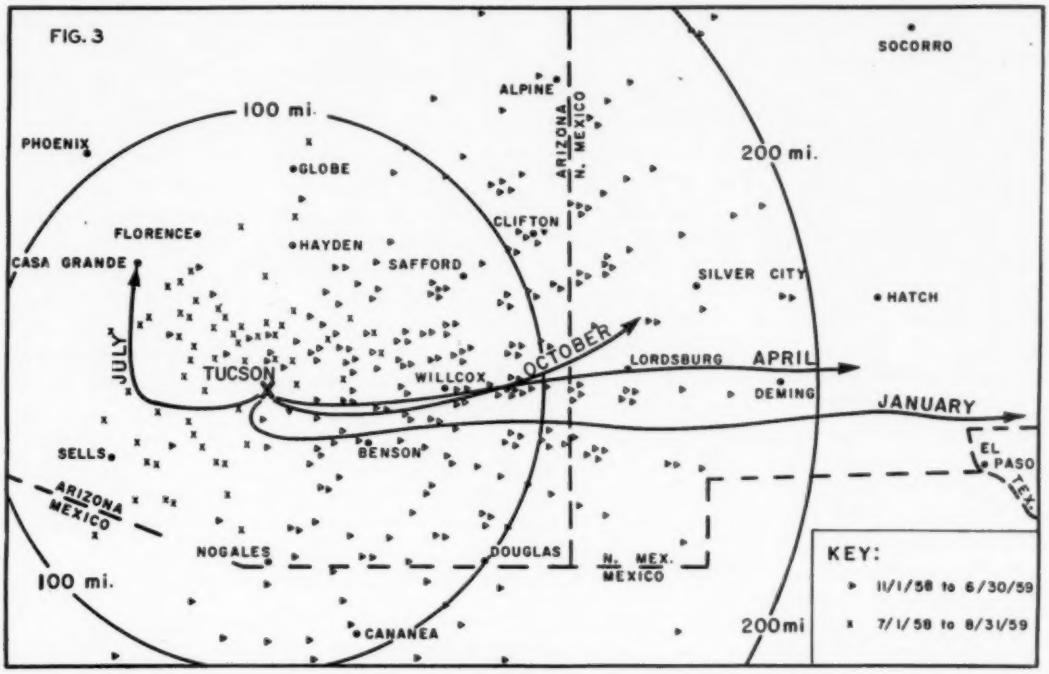

Fig. 3

with respect to the vector-resultant wind throughout the entire layer from about the level of the stratospheric mushroom cloud down to the ground. Mere surface wind information is of no help, for the vector-resultant wind for the entire troposphere may be 180° opposed to the surface wind (e.g., the August afternoon surface wind at Tucson is almost invariably from the northwest, but the mean fallout drift for August is *towards* the northwest; here is an instance where a little knowledge may be a fatal thing).

The U. S. Weather Bureau has for several years been computing twice-daily fallout winds at about sixty upper-air observing stations throughout the country in order to have available, at any moment, fallout winds no more than 12 hours old. In Arizona it is the Tucson Weather Bureau office that is currently performing this function. To indicate the Arizona areas that are most likely to be subjected to local fallout, I have plotted in Fig. 3 the locally available data for the ten months, November-August, 1958-59. Each plotted point in the figure represents the calculated distance and direction towards which fallout particles of a particular size (220 micron diameter, density 2.5 g/cm^3) would have drifted during fall from the 80,000-ft. level on a particular day (not indicated in the figure). Such particles require three hours to fall 80,000 ft., so Figure 3 presents 3-hr. drift loci. Available evidence (Kellogg, and others, 1957) suggests that only about 15 per cent of the local fallout comes down on particles as large as or larger than 220 microns in diameter, so it is important to note that most of the fallout from 80,000 ft. travels much farther than the points of Figure 3 indicate. However, because the bulk of the fission products effectively start their fall not from near the top at 85,000 ft., but from a mean height of perhaps 60,000 ft., nearer the base of the mushroom cloud, one may take these points as tolerably good indicators of average fallout drift for all particle sizes and all heights of origin. (The actual fallout process involves innumerable trajectories for a continuum of particle sizes and for a continuous distribution of heights of origin. Hence a really detailed prediction of fallout patterns can only be carried out through use of high-speed electronic computation (Kellogg, and others, 1957).

In Figure 3, the points for the two summer months of July and August, 1959, are distinc-

tively symbolized with crosses to bring out the fact, exceedingly important to the Arizonan, that the mean fallout drift during the summer rainy season is almost opposite to that for the other eight plotted months (triangles). To emphasize this significant point, I have computed and plotted in Figure 3 four different *mean monthly fallout* trajectories (solid curves in figure) for particles whose diameters are equal to the median diameter observed in actual bomb-tests, namely 100 microns. Such particles fall to the ground in about six hours from the 75,000-ft. height of origin assumed in calculating these trajectories. The wind data were ten-year means for the period 1946-55 (Ratner, 1957). Examination of these four trajectories plus study of the mean wind data for the other eight months of the year showed that southern Arizona mean fallout vectors point almost due east throughout all the year except during July and August, when southeasterly upper-airflow prevails. It is a point of some meterological interest and of considerable importance to the potential evacuee that a peculiar 90-degree bend occurs in the July (and August) mean trajectory. This results from mean east-to-west drift of particles while they are still falling through the stratosphere followed by mean south-to-north drift while falling from the tropopause to the surface.

The Tucson fallout data of Figure 3 are almost equally applicable to Phoenix, since there are usually only very slight differences in upper-air wind speeds and directions over the 100-mile distance separating Tucson and Phoenix. That is, one may simply translate these patterns bodily, bringing ground zero onto Phoenix to infer the downwind fallout problems associated with a Phoenix attack.

The ground-level dosage rates vary with weapon yield and with meterological conditions and, of course, with time. It has been established that the variation with time since detonation, t, may be reasonably well described by a $t^{-1.2}$ decay law, a composite of many different exponential decay laws of many different radioactive fission products. Thus, every sevenfold increase in time since detonation brings roughly a tenfold reduction in ground-level dosage rate (once all the fallout destined to reach a given spot has arrived there). Consider, for example, a locality such as Willcox or Globe in winter, with west-to-east drift. No gamma-active dusts would arrive until perhaps two hours after the attack. But after that elapsed time, the dust would start sifting down, and the gamma-dosage rate would begin to climb as more and more of the finer dusts arrived. Maximum dosage rate might occur in Willcox or Globe at about six to eight hours after detonation, for not only will most of the dust particles that have fall-times greater than this tend to drift right on over Willcox or Globe, but also, of course, all the fission products, whether on the ground or still settling to the ground, are losing their activity as time progresses. If we take 7 hours after detonation as the time of peak ground-level dosage rate, then in view of the $t^{-1.2}$ law, the dosage rates will be down to about 10 per cent of their peak value in about 49 hours (7 times 7 hours) after the attack. By about two weeks (7 times 7 times 7 hours) after attack, the dosage rate at Willcox or Globe would be down to only one per cent of its peak value.

The question of human importance is that of the magnitude of these varying dosage rates as compared with the lethal whole-body dose of about 750 r (lethal in the sense that radiation sickness would bring death in a few weeks, not immediately). So many different meterological conditions can occur that only average values can be given. From bomb-test data, it has been deduced that for a 20 MT surface burst, 48-hour integrated whole-body doses equal to or greater than 750 r may be expected to exist around the target and in downwind areas comprising a total of from 2,000 to 20,000 square miles. We may take 10,000 square miles as a representative 48-hour lethal-dose area for a 20 MT surface burst. Exposure over more than 48 hours will obviously yield somewhat greater total dosage and, more important, even outside the above-specified area, persons will be exposed to what may for them be lethal dosages, since the whole-body dose at which 50 per cent fatality-rate occurs is only about 450 r. A 48-hour integrated dose of 450 r can prevail over an area as great as 30,000 square miles with certain wind conditions (Kellogg, and others, 1957).

Since the contaminated portion of the mushroom cloud itself has a diameter of about 40 miles, and since a small amount of spreading will occur, we must imagine a 50-mile-wide swath, extending some 200 miles downwind from Tucson or Phoenix, within which everyone

not heavily shielded against gamma radiation will receive, in two days subsequent to the attack, fatal doses of radiation. Such communities as Superior, Miami, Globe, Benson, and Willcox are therefore radiologically about as vulnerable as the target cities of Tucson and Phoenix. Furthermore, Figure 3 reveals convincingly that variations of the actual upper winds from their average west-to-east direction are great enough and frequent enough that Casa Grande, Florence, McNary, Showlow, and Springerville would be within the lethal-dosage fallout areas extending downwind from Phoenix on many days, while Tombstone, Bisbee, Douglas, Safford, and Clifton are frequently within Tucson's lethal-dosage fallout area. Persons in any of these areas would have to leave their homes and go to an area not contaminated by fallout from still other targets or else stay for a period of the order of two weeks in some kind of underground shelter that gave a protection factor high enough to match the local dosage rates. Simply to stay aboveground and go about one's work anywhere within the entire 10,000-square-mile area would insure the sequence of nausea, vomiting, and hemorrhaging that ends in death due to the complex and deep-seated physiological damage loosely described as "radiation sickness."

EVACUATION AND SURVIVAL. — Although numerous air-raid sirens have been set up in cities such as Tucson and Phoenix, recent ICBM developments make them of dubious value: Tucson is about 15 minutes by ICBM from the Anadyr Peninsula of Siberia where potentially hostile missile launching pads now exist (Galloway, 1957). Even if subsonic manned aircraft are the only nuclear bombing threat at date of this writing, it is safe to predict that this situation will change within only a few years to threat of hostile 15-20,000 mph ICBM's. At that time "evacuation" can have only one meaning — evacuation *after* attack.

The quantitative bomb-damage estimates outlined above show all too convincingly (at least to those who see them as following logically from the physical laws governing bomb phenomenology) that evacuation of Tucson and Phoenix would be an incredibly difficult task. Consider Tucson. In the hypothetical attack discussed here, nine-tenths of Tucson's homes are estimated to be demolished, many going down about the heads of their owners, immediately creating a mass of perhaps 175,000 homeless persons, many already dead or seriously wounded from mechanical injuries, others severely burned by direct thermal radiation skin-burns or by burns from clothing radiatively ignited. Another 25,000 Tucsonans in the fringe areas would be confronted with badly damaged homes and with non-fatal but serious mechanical and radiation injuries. All of this within a minute after detonation. Over most of the city, cars and trucks would have been rendered undrivable by blast damage, but even if drivable, the presence of barricades of power and telephone lines and utility poles lying across block after block of streets, with trees and building debris interstrewn, would preclude evacuation by car from all points closer than a dozen miles from ground zero. For the bulk of the survivors the alternatives would simply be those of walking or staying.

Consider first the alternative of staying near one's home. To stay would not be to survive unless one had adequate shielding from the fallout radiations that begin, near ground zero, within about a *half hour* or less after detonation, due to heavy fallout from the *stem* of the mushroom cloud. On the *upwind* side of ground zero, at radial distances of rather more than 10 miles, one might stay without more than mild radiation sickness and sequelae. On the downwind side, departure would be imperative, but the only possible way to go would be to circle around the soon-to-be contaminated area several miles out from ground zero. This circumnavigation of the stem-fallout area, however, is almost impossible on foot. There simply is not time enough at fast walking speed. Thus blast-survivors on the *downwind* side of the target and not far enough out to be able to escape fallout in vehicles are certain to be fallout victims. Note, however, that all of these people would, for a few weeks, be alive, though incapacitated after half a day or so by the heavy radiological injury sustained in skirting the immediate blast area.

In other geographical regions, the usual recommendation of taking refuge in one's basement offers something like a tenfold protection factor from gamma radiations originating on dust deposited on the roof or on the surrounding yard. This happens not to be nearly enough protection close to ground zero under most wind conditions, so it is often recommended that the home owner dig from his basement

into the adjacent subsoil to take advantage of shielding by the soil. But in any event, the typical Arizonan will not have to weigh the latter decision, for he has no basement. Inquiry at a large local home-building firm brought the estimate that only a fraction of one per cent of existing southern Arizona homes have basements. Public buildings with basements might offer partial shelter for a tiny fraction of the survivors of the first minute's destruction, but beyond that, the informed person would know that (if he is not in the essentially doomed downwind sector) he must get out from under the contaminated portion of the mushroom cloud, and get out exceedingly quickly. Delay beyond *tens of minutes* would be very serious, viewed radiologically. But what family could ordinarily hope to assemble its members from schools and places of work in tens of mintues to begin walking rapidly out of town? Very few, I fear, so evacuation may be a process with peculiar sociological selectivity.

Nevertheless, we may briefly examine the prospect of walking-evacuation of Tucson or Phoenix for persons on the upwind side of ground zero and located, say, 5 to 10 miles out. In the winter months this alternative is not too hopeless if we overlook the family-assembly difficulty and the low probability of any sample of four or five persons in Tucson or Phoenix being entirely uninjured and hence in walking condition. By making all possible haste, one might move westward (assuming west-to-east airflow aloft) fast enough compared to fallout descent rates that he would suffer only mild radiation sickness. Furthermore, in winter, the problem of getting drinking water is less urgent. Tucsonans, for example might get into the Avra Valley and be lucky enough to get water within a half-day, though food would quickly become a limiting factor because of lack of towns with any residual food stocks in that region west of Tucson. The Phoenix evacuee is distinctly better off in winter.

But in *summer* foot evacuation from any southern Arizona city is a nearly futile venture. From May to September, temperatures are so high that most persons cannot walk (assuming daylight attack) much more than ten to fifteen miles without water, whereas upper winds are much lighter, demanding *greater* upwind flight to get out from under the only slowly drifting contaminated cloud. On a June day with maximum temperature of 101° F., I found that I could cover slightly over 12 miles in three hours after drinking to full capacity at the start, but had lost 10 lb. and was near exhaustion at the end of that stint. This personal experiment agreed well within the results of extensive studies carried out with troops in desert areas in the Southwest during World War II (Adolph and others, 1947). *Fifteen to twenty miles* is the greatest distance to which troops in *excellent physical condition* can walk without water under average daytime southern Arizona summer conditions, judging from the Army experience. But with a contaminated radius of about 20 miles and light winds aloft, *every survivor who is to remain a survivor* will have to go roughly this distance and with no running water available anywhere along the route due to blast damage of water systems. For the young and old members of the population, this would thus be an impossible trek to make, despite its urgency. Mere thermodynamics of water consumption and questions of physical fitness impose limits to escape by foot from the target areas in summer. Even on the upwind side of ground zero in summer, the fraction of the population that could avoid lethal radiation dosage would fall very low except beyond about fifteen miles out from ground zero where vehicular evacuation would be possible. Put in the context of the Phoenix attack, a majority of Tempe residents fleeing southeastward in July or August would not be able to move fast enough and far enough towards possible temporary haven in, say, Mesa (haven in the sense of probably providing some drinking water) before receiving many hundreds of roentgens, so most of them would be almost as sure to be radiologically killed as would the more obviously doomed residents of Glendae. Tucsonans are much worsle off: On the average in July and August, Davis-Monthan AFB lies upwind of almost all of metropolitan Tucson, so a summer attack could radiologically eliminate essentially the entire population of Tucson.

Actually, this discussion of evacuation and survival can make no claim even to topical completeness, for I am not weighing psychological questions of human response to the calamity itself. Studies of what are, by comparison, small-scale disasters show that a kind of dazed paralysis often immobilizes uninjured persons for

several hours after the disaster. Since there are no carefully practiced evacuation procedures for nuclear attack, everyone will be on his own, and a state of shock that prevents intelligent action within fifteen or twenty minutes of detonation will insure radiological death for tens of thousands of residents not blast-killed but still close enough to be in the stem fallout area on the upwind side (those on the downwind side, to repeat, are essentially doomed). Add shock to the high probability that *families* will not be able to assemble for flight, and the overall psychological obstacles become as great as the purely physical obstacles.

Nevertheless, if nuclear attack must be reckoned with, it is clear that detailed knowledge of bomb phenomena is the indispensable requirement in taking advantage of every circumstance following an attack. At present such knowledge is, I believe, nearly nonexistent in the population, so its presentation to the public is urgently needed. Given much more detailed information as to the awesome prospects of nuclear warfare, we might even take more active steps to prevent their realization.

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Future Medical Meetings and Postgraduate Education

FOURTH NATIONAL CANCER CONFERENCE

Sponsored by the American Cancer Society and the National Cancer Institute, the Fourth National Cancer Conference will be held in Minneapolis, September 13, 14 and 15, 1960, at the University of Minnesota. Theme: Changing Concepts Concerning Cancer.

Program:

General Session: Address: Changing Concepts Concerning Cancer, Cancer Etiology.

Panels on: Cancer of the Breast, Cancer of the Lung, Cancer of the Female Genital Tract.

General Session: Address: Frontiers in Biology and Cancer Research, Cancer Pathogenesis and Spread.

Panels on: Cancer of the Gastrointestinal Tract, Cancer of the Male Genitourinary Tract, Leukemias and Lymphomas, Cancer in the World Around Us.

General Session: Address: Care of the Advanced Cancer Patient, Cancer Therapy.

Panels on: Cancer of the Skin, Cancer of the Head and Neck, Cancer Control.

General Session: Summary Session.

SECOND ANNUAL OREGON CANCER CONFERENCE

The Second Annual Oregon Cancer Conference is being held July 7 and 8, 1960, in Portland under the joint sponsorship of the Oregon State Medical Society, the Oregon Division of the American Cancer Society, and the University of Oregon Medical School.

An outstanding list of guest lecturers for the Conference includes Dr. Oscar Creech, Jr., of New Orleans, Professor and Chairman of the Department of Surgery at Tulane University School of Medicine; Dr. J. Hartwell Harrison of Boston, Clinical Professor of Genito-Urinary Surgery at Harvard Medical School; Dr. Henry Jaffe of Los Angeles, Director, Division of Radiation Therapy and Nuclear Medicine at Cedars of Lebanon Hospital; Dr. I. S. Ravdin of Philadelphia, Professor of Surgery at the University of Pennsylvania Medical School; and Dr. R. Wayne Rundles of Durham, North Carolina of the Department of Medicine at Duke University Medical Center.

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